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FOREWORD

In February 1956 the First International Conference on Educational Research was held at Atlantic City. The conference was sponsored by the American Educational Research Association thru its Committee on International Relations and supported in part by UNESCO. This courageous venture brought together representatives of 11 countries (Australia, Belgium, Brazil, Canada, Chile, England, France, Germany, Japan, United States, and U. S. S. R.) to discuss problems and possibilities of international cooperation in educational research.

Outcomes of the conference included recommendations for improved communications among educational research workers. As a result of these recommendations I met with participants during the last day of the conference and tentative plans for this issue were made. The project was not undertaken without some misgivings. It is a considerable task to assemble an ordinary issue of the REVIEW when chapter authors are all from the United States. The problems of obtaining contributions of REVIEW style and caliber (translated where necessary) from all over the world, on the REVIEW schedule, are formidable. At an evening meeting just before conference members scattered across the world, the project began to seem possible as well as desirable when Leo R. Fernig of UNESCO agreed to act as subchairman for Europe, assisting in obtaining contributors, and arranging for translations where necessary. The next day Victor H. Noll, Chairman of the AERA Committee on International Relations, consented to act as issue chairman despite other burdensome commitments. With this good start the concurrence of the REVIEW editorial board was obtained, and work began on the issue immediately.

The discerning reader will discover that 10 languages have been used in the bibliographies. The titles have been translated, but for the most part other bibliographical data have been left in the language of the country of origin; translation only makes finding a foreign-language reference more difficult. Unfortunately one of the languages not included is Russian; despite arduous efforts, no contribution was received from the U. S. S. R.

Educational research in the United States was reviewed in the June 1956 REVIEW (Vol. 26, No. 3) entitled "Twenty-Five Years of Educational Research." That issue and this one provide a survey of the current status and most important developments in educational research on the world scene.

It is hoped that this issue will prove of interest and value to members of the AERA and their colleagues abroad.

Tom A. Lamke, *Editor*
REVIEW OF EDUCATIONAL RESEARCH

INTRODUCTION

In view of the fact that relatively few countries are represented in this issue, it is most gratifying to have so much reported. To be sure, many references cited do not meet what would be regarded as rather liberal standards of educational research in the United States. Many seem rather obviously philosophical or even polemic in character. Also, it may probably be assumed that the countries represented at the conference, and to a somewhat similar degree those included here, are the ones that have something to report. But allowing for these considerations, there still remains, taken altogether, a substantial body of apparently solid research material in the reports. This should be a matter of great satisfaction and encouragement to the members of the American Educational Research Association and to all those who are devoted to research as a method of attacking educational problems and achieving progress.

One cannot help but be impressed also by the great variation in standards or ideas of what constitutes research. This has already been alluded to in the preceding paragraph, but it deserves some further comment. In the guide sheet sent to all contributors, some criteria were offered as guides that would tend to restrict the material cited to what would generally fall within the purview of regular issues of the REVIEW. The 11 categories which they regularly cover were given as a scheme of organization. This was quite consistently adhered to by contributors. Also, the following statement was included: "Articles presenting conclusions based largely or solely on the opinions or judgments of the author do not fall within the purview of this issue." In spite of these suggestions many reports were cited which obviously violate this restriction. In some cases this may have been the result of a natural desire to make a good showing. It seems, also, to reveal a wide variation in concept of what constitutes research. In this country it is generally recognized that greatest progress in education and psychology resulted when they separated from philosophy, and applied scientific rather than philosophical methods to their problems. Whether this would follow in other countries we do not know, but probably most members of the AERA would think so. In any case, these variations and divergencies of viewpoint regarding the nature, purposes, and sphere of educational research present a very real problem in communication. They indicate a need for a meeting of minds, for continuing exchange of views, and for regular open channels of communication between research workers wherever they may be. This issue of the REVIEW may serve a very useful purpose in emphasizing the need for such communication and suggesting means for meeting it. There would seem to be no doubt that the need exists, that there is something worth communicating, that there is an interest in moving forward, and that there is a willingness to cooperate in widely scattered parts of the globe.

Another respect in which the reports emphasize differences is with respect to terminology. In some cases this is probably due at least in part to the difficulties of translation into English. But even in the reports prepared in English-speaking countries strange terms appear now and then, and one suspects that meaning may sometimes be changed or lost because familiar words are used in unfamiliar ways or context. These language barriers are too well known to require discussion here, but experience with this international issue of the REVIEW serves to give renewed emphasis to the need for some thoro study of educational terminology in different countries and the production of an international dictionary in this field.

Finally, it should be said that while differences exist, substantial similarities and agreements are also evident in these reports. Among these are concern with much the same educational problems and needs in all countries. Illiteracy, the slow learner, the teaching of the basic fundamentals, development of character and personality, problems of adjustment, counseling, selection, education of teachers, and the psychology of learning, to name but a few of those found in nearly every paper, bring out the similarity of the issues that face education everywhere today.

If, as this issue of the REVIEW strongly suggests, the fundamental problems of education are the same in most countries, the differences which may cause misunderstanding and impede progress should certainly be brought out into the open, examined, and discussed. If this is done, most of them will probably either be resolved or gradually disappear. To accomplish this, continuous and free communication is needed. It is hoped that this issue of the REVIEW may contribute to this objective.

Especial thanks are due Leo R. Fernig of UNESCO who acted as regional chairman for continental Europe, and Ismael Rodriguez Bou, who accepted a similar responsibility for Latin America. Reviews from these two parts of the world are the results of their respective efforts, including translations where necessary. W. C. Radford assisted by obtaining the contribution from New Zealand. The chairman wishes also to express particular appreciation to the editor of the REVIEW, Tom A. Lamke, who did most of the preliminary corresponding and was of great assistance in the entire project.

Victor H. Noll, *Chairman*
Committee on Educational Research
in Countries Outside the U. S. A.

CHAPTER I

Australia and New Zealand

Section A: Australia

W. C. RADFORD*

IN AUSTRALIA, educational research is undertaken in universities, state departments of education, teachers colleges, the Commonwealth Office of Education (COE), and the Australian Council for Educational Research (ACER). The growth of university departments of education since World War II has led to an increased volume of research work. Relatively little work is reported in book form, and as there is no journal devoted specifically to research, what appears in print is restricted in quantity and is often presented in too condensed a form for proper appraisal. This survey draws on mimeographed materials and on articles and abstracts in books and journals.

There is no central repository for abstracts nor any microfilming service for distribution overseas of unpublished research studies. Within Australia, interlibrary loans provide some help. The ACER (2) distributed in 1953 a list of theses in university libraries in Australia and published one supplement in 1955. Since 1950 the COE (15) has prepared an annual listing of research entitled *Educational Research Being Undertaken in Australia* which since 1952 has included selected abstracts.

State departments are concerned mostly with research into their own administrative problems, the COE with questions related to its particular functions, and the ACER with matters of Australian significance. The universities have not developed specialties altho there are signs that they are tending to do so. No center in Australia is devoted solely to research into a particular area of education altho the ACER has a section devoted to test development and research and the University of Queensland has a remedial education center. There are as yet no child development centers. The growth of departments of psychology in the universities has led recently to greater interest in the social psychology of education.

In general, Australia has few trained research workers engaged in research since many of those with the necessary training move into administrative work in which time and opportunity for research are limited. University staffs have varied in productivity, and most of their time is spent in supervising and guiding students, very few of whom move immediately into research work.

Many important areas of education have received scant attention in print. There is an absence of studies of the administrative process, little work of a general sociological nature, and very little attention given to problems of methodology. Little has yet been attempted in integrating completed research work or determining its implications. In general, it is still true that Australian research is not strongly influencing Australian practice. Few experimental studies are reported; the majority of the work done is by survey, and the use of the more recently devised technics of research is still rare.

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* The author is indebted to T. S. Duff and M. Dunstan for assistance in compiling the materials on which this review is based.

Administration

Butts (9) presented a survey of assumptions underlying Australian education and of their observed effects, following six months of observation as a Fulbright scholar. The administrative process in Australia—the effects of centralized administration and the place of the private and church schools, for example—has not otherwise been critically examined. Research into aspects of administration has been chiefly (a) descriptive surveys, (b) predictions of enrolments, (c) studies of wastage of talent, and (d) analyses of defects in facilities.

A general description of the operation and administration of aspects of compulsory education in Australia was prepared by the Australian National Cooperating Body for Education and published by UNESCO (68). A more comprehensive account of Australian education, prepared mostly by the COE, appeared in the Commonwealth Year Book (12). Illustrative of other descriptive matter are COE bulletins dealing with such subjects as guidance services (13), and the ACER survey of non-government schools (57) and its *Review of Education in Australia 1948-54* (36). The state of government secondary schools in New South Wales was reviewed by the teachers federation of that state in evidence before a committee of inquiry (43).

All state departments are engaged for practical reasons in predicting future enrolments. For example, the Queensland Department of Public Instruction (50) estimated that by 1961, it would require 25 new high schools and 56 new secondary "tops" to primary schools, and over 1100 additional teachers for such schools. The COE (16) forecast an enrolment of 43,000 in Australian universities in 1962—an increase of 45 percent over the 1955 figures. A great deal of important work is never published but forms the basis of administrative policies.

Brown (6) made a careful study of the holding power of high schools in Sydney and found academic high schools had greater holding power than other types. Continuation in secondary schools, among boys of equal ability, was related to father's occupation. In order of importance boys gave their reasons for leaving school as lack of success in study, desire for independence, irrelevance of school, and financial hardship. At the tertiary level, Hohne (28, 29), Olson (46), and others were concerned with academic failures at universities and pointed out high failure rates. Studies within technical schools in New South Wales also indicated high rates of loss there (36).

Defects in accommodation and overlarge classes were publicly reported by teachers bodies. Typical of these was a survey made by the Victorian Teachers' Union (69) of some 500 schools, in which 32 percent of classes had more than 45 pupils each. In New South Wales the teachers federation (43) reported that 16 percent of secondary classes had more than 45 pupils each in 1955, 33 percent having more than 40 each.

The major change in administrative practice in this period was decentralization of some aspects of administration in New South Wales following a five-year experiment in one area. No empirical evidence was presented, the decision being based on observation and administrative assessment of its value (79).

Curriculum

There was little discussion of principles and technics of curriculum construction. Most studies were concerned with subjects or grouping of subjects, and critical analyses were rare. Schonell (62) and Wheeler (71) discussed the general principles of curriculum building with particular reference to individual needs and desirable outcomes, and Connell (17) recommended the use of laboratory workshops for cooperative curriculum building.

The most comprehensive study made of actual offerings was that published by the ACER (3) in *English and Arithmetic for the Australian Child.* After an analysis of courses in English and arithmetic used in the six states, of teaching practices, and of test results from some 30,000 children in Grades III thru VIII, it reported wide variation in expectation and achievement at comparable ages, in time allotments, and in teaching practices.

More published attention has been given to social studies than to other topics or subjects. For example, Rogers (59) reported a suggestive experiment lacking in research precision, in which teachers in training used group procedures in social studies lessons in Grades III thru VIII and found them workable in the primary school. Rayner (58) investigated the knowledge of civic matters of children at an age just before the end of compulsory schooling and found unexpected ignorance of very common social concepts.

In a series of comparative studies, the Queensland Department of Public Instruction (52, 53, 54) assessed the achievement in arithmetic, reading, and spelling of children in Queensland schools and found that syllabus changes had not led to deterioration in quality of work.

Educational Measurement

There was constant appraisal of the validity and reliability of measuring instruments, and improvement in the quality of test manuals and testing practice, but little reported work on fundamental questions of measurement, on the application of advanced statistical technics, or on the development of new tools or procedures.

Accepted practices were called into question. Keats (33), in a careful examination of distributions of scores on standardized tests, found that they could be represented adequately by the Beta Function; he discussed the dependence of mean and variance in such distributions, and pointed out that this could invalidate the use of currently used technics. Spearritt and Keats (65) reported on longitudinal comparisons of IQ's on comparable tests at different ages, and arising from these, recommended the use of percentile norms rather than standard score IQ's.

Testing programs yielding valuable results for guidance were reported by Spearritt (64), who worked with 18-year-old National Service trainees, and by the Queensland Department of Public Instruction (56) which periodically checked the effectiveness of its guidance battery.

Hohne (28, 29) related test and prior examination results of university students in Melbourne to their later university success. Philp and Cullen (48) investigated the relation of age and academic success of entrants to the University of Sydney, and Sanders (61) continued his work in the same field, presenting a comprehensive review of studies made in Australia and elsewhere.

Typical of other work on measurement technics were Howie's examination (31) of the Burt and Thurstone methods of factorizing data, and Gault's factorial study (23) of the *WISC*.

Educational Psychology

Examples cited below are typical of the varied specific work reported in this general area.

Pentony (47) found that there was a positive relationship between a democratic home environment and sociability and constructiveness in the nursery school, that recent arrivals from European countries tended to be more authoritarian, and that children from such families tended to be withdrawn in play center situations.

Debus (20) reported aggression typical of the behavior of 32 three- and four-year-olds studied in a play situation over a 40-day period. About one-fifth was unprovoked. There were indications that aggressiveness and unsatisfactory home conditions were related.

Buckle (7) studied speech defects and lateral dominance in groups of 100 cases of stammer, 100 cases of dyslalia, and 100 randomly chosen normal children. He found no association between dominance and speech defects.

Wyeth (78), Eymard (22), and others studied aspects of personality of school children, using the Tryon "Guess Who?" technic, and sociometric questions. The outstanding findings were that leaders or accepted children are those who can identify with and supply the needs of others in the school situation, and that rejected children are those who hinder the group. Wheeler (73) presented a careful analytic study of Western Australian adolescents centered around popularity and status, pointing out that there were differences between the characteristics favored within and outside the classroom.

Staff and students of the Department of Education, University of Queensland, under Schonell's guidance studied the incidence of backwardness and dullness in many Queensland schools. For example, Meddleton (39) studied three large schools in Brisbane in which general backwardness (attainment 85 percent or less of normal for chronological age) was found in 11 percent of children.

Educational Sociology

Studies in this area have so far been fragmentary and uncoordinated, but there is growing interest in educational sociology.

Collins (11) surveyed the intelligence of Tasmanian school children, and found negative correlations between intelligence and size of family, zero correlations between intelligence and birth order, and significant differences between the average intelligence of occupational groups.

Crane (19), after studying reports of gang membership in their adolescent years given by teachers college students at Armidale, New South Wales, concluded that gangs do not necessarily arise only in subnormal or borderline environments, nor is membership in them a symptom of predelinquency. In a later article (18), based on work with children, he concluded that, between the ages of 10 and 14, boys tend to gang membership more than girls because they tend to identify less during those ages with a male adult with whom they are in close contact.

Greig (24) studied the job expectations of boys in Victorian junior technical schools (ages about 14 or 15) and found few boys or their parents able to make realistic choices based on knowledge of jobs, of qualifications for them, or of abilities needed.

Studies of reading habits, radio listening, and attendance at cinema were reported. Typical of these were two studies by Wyeth on radio listening, one a cross-sectional (77) and the other a longitudinal study (76). Changes with age were reported in the kind of program listened to.

The work of the Department of Psychology in the University of Melbourne broke new ground for Australia. Oeser and Hammond (45) and Oeser and Emery (44) reported sophisticated analyses of a complex collection of data related to family attitudes, family structure, social class, child upbringing, and school climate in (a) a Protestant group in a middle-class suburb in Melbourne, and (b) a rural area in Victoria. The studies are distinctive both in their technics of data collection, and in the ingenuity and logical intensity of the analyses made of the data. Their implications for education lie in the demonstrations given of the relation of (a) parental and teacher attitudes to child behavior, and (b) the child's perception of the school and its task to his attitudes toward school.

Guidance and Counseling

No specific studies were reported. Related studies with implications for guidance, reported elsewhere, are those of Hohne (28), Olson (46), Greig (24), Kemp (34), Spearritt (64), and the Queensland Department of Public Instruction (56).

Mental and Physical Development

There have been no longitudinal studies yet completed in Australia, and, as in other areas, there are no integrated programs based on a definite research plan. The nature of the work being done is illustrated by the following examples.

Kemp (34) studied a group of 243 children in two secondary schools in New South Wales and concluded that slightly more than 50 percent exhibited a relatively stable IQ from year to year. The remainder were less stable, some fluctuating 20 to 30 points of IQ.

Burge (8) prepared and normed tests of running speed, eye and hand coordination, agility, spring, strength, and endurance. Growth in general physical ability increased from 9 thru 13 years of age (as far as this study went). Information was given about sex differences and the relation of physical ability to many other factors. Physical ability appeared to play a much more significant part in the life of a boy than of a girl.

Language Arts

Attention was devoted principally to reading, spelling, and vocabulary as they affect school practice and standards. There were studies of standards, of technics, and of methods for improving results. Following are illustrative examples.

Horwood (30) discussed the principles to be used in the study of the vocabulary of school readers and applied these to a Tasmanian reader. Anderson (1) and Pond (49) analyzed the vocabulary of several readers, and Pond the content also, pointing out differences between different reading books in current use in schools. Wheeler (72) compared the reading speed of Australian and American children on the basis of published norms and concluded that Australian speeds were slower.

The Queensland Department of Public Instruction (51) reported an evaluation of the results of teaching reading by whole word and by phonic methods. Neither method produced clearly superior results, but the general conclusions favored the whole-word method because of such matters as increased interest in reading.

Matthews (38) surveyed methods of teaching spelling to Grades V, VI, and VII in 11 South Australian schools. Teachers' methods varied considerably, and recommendations based on the replies given to a questionnaire gave emphasis to more child-centered methods. Walker (70) examined the value of pretesting in spelling in 52 classes from Grades II to VI in nine schools in Western Australia and concluded that it was an efficient means of presenting words of average difficulty provided it was followed by organized specific learning. McDonald (35) reported that the percentages of words accurately spelled in compositions by South Australian children rose from 94.5 in Grade II to 98.7 in Grade VII.

The ACER (4) reported in bulletins the results of an intensive study of the speech of 24 children from an industrial suburb. In addition to other analyses, a vocabulary of the 480 most common words used in speech by these children was compiled and compared with other vocabulary lists. When classified by function, differences were found between the sexes in the use of speech and its relation to other characteristics of the children (5). Schonell and others (63) reported a detailed study of the oral vocabulary of the Australian worker based on recordings and interviews, carefully analyzed and classified.

Mathematics

Cawte (10) reported an experiment in a South Australian primary school which raised the standard of arithmetic by the regular motivated use of speed and accuracy tests.

Nay (42) demonstrated that classes taught arithmetic every day of every week as is normally the practice were not appreciably better at arithmetic after 24 weeks than classes similar in ability receiving about one-third less teaching.

The Department of Public Instruction in Queensland (55) determined for Queensland children in Grade III the relative difficulty of basic multiplication and division facts and of the relevant decade addition and subtraction facts, and found they did not always conform to the findings of overseas investigators.

Science

There is a surprising lack of work in this field. Meyer (40) reported that biology was taught in less than 20 percent of secondary schools in New South Wales, to about 12 percent of secondary-school pupils. Meyer (41) also reported the tendency at Leaving Certificate level in New South Wales to reserve biology for the less able students. Harris (27) made a broad exploratory investigation into nature study in Grades III and IV in New South Wales and claimed improvements in knowledge and understanding due to a carefully prepared curriculum. Woods (74) showed that many geographical terms used in course textbooks were not known to children for whom the texts were recommended, and that these texts carried a heavy burden of words not included in Thorndike word lists.

Research Methods

Keats (33) discussed problems of transformation of distributions to make mean and variance independent, suggested a new index of test reliability, and drew attention to the need for care in using many accepted technics of data analysis because so many of the assumptions underlying them were not maintained by the usual distributions of test scores.

Dunn, Keats, and Spearritt (21) drew attention to the unavoidable negative correlations between initial IQ and improvement in IQ between first and second testing with tests having artificially equated variances.

Hohne (28) reported the use of pattern analysis as one way of attempting to improve prediction of university success. He discussed, also, methods of using group Rorschach protocols for similar prediction and found global assessments more fruitful than checklists.

Reports by Oeser and Hammond (45) and Oeser and Emery (44) included numerous indexes and scales derived from their data on social structure, family structure, attitudes toward school, child adjustment, and the like. Their work is a fruitful source for ideas and procedures for use in inquiry into the social psychology of education. Family structure, for example, was classified, as a result of child responses to a set of simple questions about who does what in the home, into husband autocratic, wife autocratic, autonomic, and syncretic, and these patterns were then related to many aspects of child life and adjustment (45). The matrix sorter devised by Hammond (26) has been used to advantage in the economical analysis of many matrixes of variables.

Special Programs

Altho there are many provisions for handicapped children and other special groups, these programs are rarely evaluated by direct methods. Subjective assessment still plays a large part in decision about methods, organization, or continuation of programs.

Jones (32) examined the high-school records of bright pupils selected in certain New South Wales primary schools for special opportunity classes in the Classes V and VI. The pupils tended to remain longer at secondary school than the remainder of their generation, but no longer than a similar group matched on age, intellectual ability, and school attainments prior to high-school entrance.

Brereton, working in the COE, studied educational problems associated with hard-of-hearing children. She developed measures for assessing the achievement of children in certain educational fields taking into account age, degree of hearing loss, and intelligence (15).

Thody (66) analyzed the university records of students who first passed the examinations for matriculation to the University of Melbourne at an age lower than normally accepted by the university for entrance. He concluded that there was a minimum level of success on the matriculation examination below which such students should not proceed immediately to the university but should spend at least another year at school.

Teacher Personnel

Recruitment and selection of teachers have been major problems in Australia since World War II. No exact appraisal of the effectiveness of either was made, and research in the area, altho it increased, was disappointing in quantity and often lacking in exact relevance to success on the job.

Hale (25), reporting briefly on an exhaustive study of students in teachers colleges in New South Wales, found little change in a wide range of attitudes assessed at the beginning and end of a two-year course.

Wyeth (75) found that for over 1000 student teachers in teachers colleges in Australia the best liked teachers were those who were friendly, helpful, of good teaching ability, cheerful, patient, tactful, considerate, understanding, good mixers with students, strict, and good disciplinarians. The least liked were harsh, cruel, overstrict, sarcastic, nagging, and sneering.

McIlroy and Ritter (37) examined the socioeconomic background of student teachers in Victorian teachers colleges in 1951 and found that in general they came from employee groups and would not be improved in economic status above their own families by becoming teachers. Female students came from homes of a higher socioeconomic level than did male students. Rural areas provided more students than the metropolitan area.

Turner (67) reported that Sydney Teachers College students with two years' training there performed on the ETS *National Teacher Examinations* as well as a four-year trained group in 21 institutions in the United States; the four-year trained group in Sydney was distinctly superior to the United States group.

Representative of discussions of courses was one by St. Ellen and Shears (60), who described an integrated two-year course in education for student teachers in a teachers college in Melbourne, designed to integrate history, principles, and psychology.

Conclusion

Increasing attention was given during the period under review to aspects of social psychology of education, the major published work in this field emanating from the University of Melbourne. The social dynamics of learning situations in school and teachers college classrooms was examined by postgraduate students and by staffs of teachers colleges and university departments. A number of publications dealt with historical matters such as the growth of the centralized and Catholic systems, the work of leading Australian educators, and the development of secondary education; these are not reported here but constitute a considerable body of material. Attention was also given to teachers, their origin, assessment, and training.

Current interest in the needs of a technological society is drawing increasing attention to questions of conservation of human talent, the nature of secondary education, and the purposes and effectiveness of university education. Care will be needed in the next decade to ensure that kindergarten and elementary education are not neglected.

At the present time probably the outstanding complex of problems requiring coordinated study are those relating to the content of secondary education.

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Section B: New Zealand

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COMPREHENSIVE surveys of the education system appear in the *Annual Reports* of the Minister of Education. These reports present basic statistics of education at all levels, and review special administrative problems.

Administration

Some of the more notable of the studies in administration were concerned with the provision of school buildings (42), character training in the schools (42), technical education (43), the supply of teachers (43), and the control of Maori schools (43). Estimates of the future school population have also received careful attention (41, 53).

The emergence of a system of compulsory education in New Zealand and the evolution of methods of introducing compulsory education laws (70) were analyzed by Campbell and Parkyn; the relationship between centralized and decentralized patterns of organization in New Zealand were carefully examined in a symposium on administration (57); parents' attitudes toward coeducation were surveyed (68); and Roth's biography of George Hogben (61) threw light on the character and career of the first director of education. The changing role of inspectors was assessed by Ball and Campbell (6).

Curriculum

The work of syllabus revision committees is described in several of the *Annual Reports* of the Department of Education (41, 42, 43).

Educational Measurement

Fieldhouse's standardization of reading tests (24, 25) and arithmetic tests has enabled national norms to be compiled; comparisons were made between New Zealand and Australian children. Spelling attainment was surveyed (62), and the fading of arithmetic skill was investigated (64). Analyses of tests administered to 18-year-olds undergoing compulsory military training enabled other comparisons to be made between the relative levels of ability and education of young people in England and New Zealand (65). Burnham (13) reported results of testing New Zealand university students with American and Australian tests of scholastic aptitude. Fitt (26) suggested certain modifications in the norms of the *Revised Stanford-Binet Scale* so that they would be applicable in New Zealand, and Fitt and Rogers (28) studied the sex factor in intelligence test scores. Walters (77) presented *Wechsler-Bellevue* test results of prison inmates. The possibility of a decline in the general level of intelligence in the community was considered by Bernardelli (12).

Educational Psychology

The development of the ideal self and the growth of ideas of morality in New Zealand children were described by Havighurst and others (31). The emergence of ideas of social differentiation and their relationship to moral qualities were studied by Congalton (19) and Jeffery (33); and Parkyn (56) traced the relationship between the ethos of the English "public school" and the New Zealand high school. The relationships between ethnocentrism and factors, such as intelligence and religion, were examined by Campbell (17). The use of Thurstone's technics to measure attitudes toward aliens was demonstrated by Fitt (27), and a careful study of the degree to which attitudes toward aliens could be changed by the presentation of informative materials was made by McCreary (37). Attention was given to the influence of leisure-time activities upon the personality of young people (1, 14, 66). Temperamental components of personality (3, 4) and the influence of intelligence and certain temperamental factors upon scholastic achievement at the university were studied by Adcock (2). Ritchie used *Rorschach* material to investigate the basic personality of Maori children (59).

Educational Sociology

Considerable work was done upon the educational and social effects of contacts between the Maori and the European cultures in New Zealand; cultural factors influencing the relative performance of both Maoris and Europeans on tests of intelligence also received attention (5, 76). The role of the schools in developing the Maori people was considered (43, 58). Beeby (10) made a sociological and educational analysis of the problem of building up a school system in Western Samoa. Studies of the assimilation of recent migrants from Europe were reported (30, 78). Congalton (20) and Congalton and Havighurst (21) investigated the social status of different occupations and compared the New Zealand and English rankings of the same groups of occupations.

Guidance and Counseling

The growth of psychological services was reviewed by Hunter (32) and Winterbourn (83). Beaglehole (7) and Beaglehole and Ferguson (8) made a careful study of factors causing mental ill-health in New Zealand and showed the need for guidance services.

Mental and Physical Development

The New Zealand Department of Health (48) reported that striking increases in the height and weight of children at all ages from 6 to 15 years took place in the two decades between 1934 and 1954. An important biometrical study of the eruption of permanent teeth was made by Leslie (34), and the incidence of physical defects among high-school pupils received some attention (9).

White (79) produced a penetrating study of the influence of literature upon the mental growth of a child from age two to five. Campbell reported on the emergence of heterosexual interests in early adolescence (15), and on the influence of age upon social acceptability (16). Reports on personality change after frontal lobe surgery were presented by Rogers (60).

Language Arts, Fine Arts, Natural Sciences, and Mathematics

The various stages thru which skill in different aspects of written composition develops were investigated by Ford (29). The teaching of mathematics to high-school pupils of average ability was analyzed by Murdoch (40), and Coe and Coe (18) showed how the expressive values of children's art can be carried thru to adolescence.

Research Methods

At the Uppsala Symposium on Psychological Factor Analysis in 1953 (74), which marked an important step forward in the field of factor analysis, Whittle (80) presented a method of estimating in one stage both the loadings of the factors in tests and the factor values possessed by the people tested.

Special Programs

Not enough research has been carried out in any one special area for trends to be noted; nevertheless, several significant investigations have been made. In the field of rural education, the problems of consolidating small primary schools were carefully studied by Parkyn (55), a historical account of efforts to define the problems of agricultural education was produced by Wild (82), and the problems of the small rural high school were elucidated by Thom (67).

Higher education has been much concerned with the future requirements of various professions; e.g., medicine (73), engineering (50), and architecture (51). Dick and others (23) analyzed the academic record of science graduates. The method of accrediting high-school students for entrance to the university came under review (71, 72, 81), and the work of extramural students was assessed (75). The provision of residential halls for students was examined by Turner (69).

The needs and the care of crippled children (63), the mentally defective (46), the emotionally maladjusted (49), and children with speech defects (22) received considerable attention; and many aspects of delinquency were the subject of inquiry (11, 35, 36, 38, 39, 44, 52, 54).

Teacher Personnel

A considerable body of unpublished material relating to the appointment and the training of teachers was summarized in the reports of Consultative Committees (45, 47); the *Annual Reports* of the Minister of Education provide much information relating to the problems of the grading and appointment of teachers (41, 42).

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CHAPTER II

Canada

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To understand the nature and purpose of educational research in Canada and its organization, some knowledge of the structure of Canadian education is essential. Canada has a federal system of government, which gives some uniformity and unity politically, but in education the component parts—the provinces—reign supreme. Some exceptions do exist, such as in the case of the education of Indians (likely soon to be returned to the provinces) and of Eskimos, and a carefully exercised interest (largely financial) in vocational education. But for the most part education from kindergarten to the postgraduate level is a provincial matter, and these provincial rights are jealously guarded. Pertinent to the present discussion is the note that the federal National Research Council has no section, or even a minor division, dealing with education.

Among the 10 provinces, the organization of education is marked more by diversity than by uniformity. While this opens intriguing vistas for educational research, at the same time it imposes severe limitations upon research at a national level. For instance, some provinces (e.g., British Columbia, Manitoba) have a single public school system; other provinces (Alberta, Saskatchewan, Ontario) have what are known as Separate Schools (denominational, Roman Catholic or Protestant); one province (Quebec) has a completely dual system (Catholic and Protestant); and the newest province (Newfoundland) has a sort of fourfold system of education, with schools belonging to each of the major religious denominations. Canada has two official languages, English and French. In some provinces, however, English is the sole medium of instruction and communication at one or all school levels; in others, one system of schools may be largely French-speaking and the other largely English-speaking; in still other provinces attempts are made to use both languages as mediums of instruction and communication. As a matter of interest to those partial to historical research, in at least one province (Ontario) the schools have also in the distant past used German, Gaelic, and one or more of the several Indian languages. Ages of compulsory attendance differ; so do school terms, number of years in the complete school program (11 to 13), organization of schools (the plans include 8-5, 6-3-3, 6-2-7, 7-4, and other interesting combinations), curriculums, and numerous other features.

Research at the National Level

Any formal organization for educational research at the national level is, as intimated earlier, most noteworthy by its absence. The Dominion

Bureau of Statistics (operated under the Department of Trade and Commerce) does have an Education Division, which in turn has a Research Section, but by custom and regulation the efforts of the Division are directed almost entirely to the collection and publication of educational statistics. As previously noted, the National Research Council does not participate in or grant funds for educational research. Nongovernmental agencies, however, have established something of a national organization. The Canadian Teachers Federation established a small Research Division in 1953, and the Canadian Education Association (a voluntary organization of provincial educators and administrators) has for many years given research grants thru its Research Council (formerly the Canadian Council for Educational Research). The Canadian Education Association is one of three associations which in 1953 set up the National Advisory Committee on Educational Research, the other partners being the Canadian Teachers Federation and l'Association Canadienne des Educateurs de Langue Française (the Association of French Language Educators). The Canadian Education Association has also sponsored *ad hoc* research committees such as those on school health and on practical education. These arrangements by nongovernmental agencies, however, constitute more of a national headquarters than a national organization for educational research.

Research at the Provincial Level

With but two exceptions, educational research at the provincial level is conducted largely by university departments, schools, faculties, or colleges of education. Even this is not fully developed since the tradition in many provinces has been for teacher education and other courses in education to be a function of the provincial departments of education, not of the universities. As a consequence, few provincial universities have an adequate supply of either staff or students to conduct competent educational research. The mutually highly beneficial, and necessary, interaction of graduate students in education and of educational research is too well known to need comment.

The two exceptions referred to above are the recently established (1953) Alberta Advisory Committee on Education Research (a joint venture of the University of Alberta, the provincial department of education, and the provincial associations of trustees, teachers, and parents), and the Department of Educational Research of the Ontario College of Education, University of Toronto, established 25 years ago under a grant from the Carnegie Corporation, which undertakes studies for the Ontario Department of Education. In part these are university organizations also, it will be noted.

Many provincial departments of education do have research sections or divisions, often associated with a curriculum branch. The division in the British Columbia Department of Education, known as the Division of Tests, Standards, and Research, is perhaps the biggest and best known of these. Relatively few of these organizations, however, conduct educational research at the level recognized as desirable in other countries.

Somewhat similar in nature and function are the committees or sections of provincial and local teachers organizations, school inspectors associations, guidance officials groups, and more general associations like the Ontario Education Association (which established a Research Section in 1954). These committees and other *ad hoc* bodies are engaged largely in fact-finding studies or the collection of educational statistics and matters of a like nature, but not in what is normally termed educational research. In fact, if the definition of some authorities were used, of *pure* educational research as contrasted with *applied*, practically none of the efforts of such groups would qualify.

Research Journals

There is no national journal of educational research. The journals of teachers and trustees organizations do carry research articles of local concern; the Department of Educational Research, University of Toronto, publishes bulletins and other research series sporadically; the new *Alberta Journal of Educational Research* is to be published quarterly; the one issue each year of the *University of Manitoba Faculty of Education Research Bulletin* has been devoted to educational research; and the Canadian Education Association from time to time publishes articles on educational research in an issue of *Canadian Education*. But to secure truly national coverage in a professional journal, a Canadian researcher would have to seek publication in one of the British or American research journals. The need for a national journal is widely recognized and rather keenly felt, but it would be difficult to establish such a journal. To provide adequately for coverage in both English and French would in itself be a problem of major proportions.

Emphasis in Research

The major emphasis in educational research in Canada appears to be on normative surveys of intelligence, achievement, and opinions; on mental test construction and use (including adaptations of American tests); and on historical educational research. Very few major studies of an experimental type have been made, and those that have been done tend to be in unrelated fields. For the most part, the research has been done by graduate students of education desirous of completing the requirements for a higher degree. Considerable fundamental research has been done, however, in the mental and social development of young children by the staff of the Institute of Child Study of the University of Toronto. One obvious reason for the lack of more fundamental research in education is the demand for what might be more properly termed *service* activities. Many of these projects are not only highly important but also highly confidential (so that the results cannot be published), but they leave little time for what might be deemed the more proper functions and responsibilities of those primarily engaged in educational research.

The research methods generally employed are, naturally, determined in the main by the type of study conducted. Consequently, one finds that the use of existing published mental tests in normative surveys, or the construction and use of specific types of tests, occurs frequently. Possibly even more common is the widespread and general use of questionnaires—rather seldom, unfortunately, directed to a scientifically selected sample (random or stratified) and competently followed up. Experimental studies for the most part involve equated or matched individuals, or random groups. Little evidence can be found of the use of the more complex factorial designs. The form of statistical analysis employed is for the most part equally unsophisticated. Only rarely does one encounter any analysis that goes beyond a simple *t*-test, possibly a chi-square test, or correlation analysis. Research workers seem to be largely unaware of the desirability of employing factorial types of experiments and modern methods of statistical analysis.

Trends in Research

Recent developments and trends are much more encouraging. There is an increasing awareness of the need for educational research and of the need to apply the findings of educational research in the classroom. More and more, leaders speak of the need for an organized attack on educational problems at both the provincial and the national level and of the value of educational research—indeed of the dire necessity of research if we are to serve the young people best and secure value for the educational dollar. This development has been accompanied (perhaps it is more accurate to say preceded) by the professional growth of teachers to the point where they are ready to play an active part in research. A similar interest in research has also been evidenced in recent years by associations of local education authorities and by parents groups. These developments have culminated in the undertaking of a number of major Canadian research studies, examples of which are the Canadian Education Association-Kellogg Project in Educational Leadership, and the Atkinson (Ontario) and Alberta longitudinal studies of utilization of student resources. The general trend is, and has been, for pure research to be restricted to universities and for all other organizations to concentrate on practical or applied research. Fortunately, there is some evidence that this cleavage is disappearing.

Administration and Finance

Major emphasis during the period has been focused on finance, not a surprising development in view of the steady increases in educational costs. LaZerte (45) gave information on school finance for the whole Dominion, and pointed out the great disparities in ability to pay that exist among the provinces. He recommended that federal funds be distributed in such a manner that the burden of supporting a foundation program of education would be equalized thruout the Dominion. The formulas proposed were based on those propounded by American writers. Of more local interest was the study by Baird (3) who reviewed school finance in Ontario and proposed grant plans for use in that province. Again major attention was given to theory and practice in the United States.

Brehaut (6) attempted to discover the factors determining differences in school transportation costs in Ontario, while Rideout (62) investigated the statutory bases for participation by municipal councils and other local government agencies in educational affairs in Saskatchewan. Using a questionnaire to principals and teachers, a committee of the British Columbia Teachers Federation (7) investigated the prevalence of dissatisfaction with large schools in that province. Evidence of dissatisfaction with the very large schools was uncovered.

Curriculum

Some studies were of general scope, while others were specifically related to one or more subjects of the curriculum. The Canadian Broadcasting Corporation (10), under the guidance of the Television Committee of the National Advisory Council on School Broadcasting, conducted an experiment in the classroom potentialities of television. The results showed that television programs have a definite contribution to make as a teaching aid. Collins and others (19) surveyed radio in Canadian schools to discover the strengths and weaknesses of school broadcasting in Canada. Church (13) evaluated 160 preschool institutions in Canada from the point of view of administration, equipment, staff, and programs and found that serious deficiencies existed in a large number of such institutions.

Crombie (22, 23) and Crombie and others (24) reported the results of a four-year study to determine a suitable secondary-school education for those who enter employment directly from school and made recommendations concerning practically every aspect of the school program. LaZerte (44) surveyed the requirements for high-school leaving and university entrance in the various provinces, and pointed out that the proportion of the electives to the total program varied from 30 percent to 60 percent, depending on the course selected. Renney (61) surveyed some aspects of rural and agricultural education in Canada, with the primary purpose of discovering what opinions on them were held by education officials, by farmers' representatives, and by rural people themselves. McColl (47) reported the results of a questionnaire to find out what the farm population considered were the most important principles of agricultural education and the curriculum needs in the preparation of farm boys for occupational competence in agriculture. The specific subjects studied by other researchers included geography (35, 65), the physical and psychological conditions affecting performance in handwriting (48), Canadian history teaching in the various provinces (39, 40), physical education in Alberta (31), the value of coloring sketches as an aid in teaching religion (8), and the science curriculum in British Columbia (29).

Educational Measurement

The bulk of the studies consisted of surveys of intelligence and achievement of school children (11, 18, 21, 26, 56, 57, 60, 70). Of these, possibly Partlow's comparison (57) of changes between 1933-1938 and 1952-1954, and Parker's survey (56) of reading achievement in Nova Scotia schools (using the *Gates Reading Survey*) would be of general interest. A few studies were made of external departmental examinations (20, 46, 51). Conway and Brown (20) suggested procedures for better selection at the university admission level.

Two studies of attitudes should be noted. Scarfe (64) had students check attributes of colleagues most liked and least liked, in an attempt to get at, indirectly, the attitudes of students toward academic education; he obtained teacher opinion on the same issue. No clear-cut answer was obtained. Young (74) investigated the attitudes of one section of the Canadian population toward Americans: There existed no pronounced "for-ness" nor "against-ness" among the high-school seniors used in the study.

Other, unrelated studies (2, 37, 49) were reported as abstracts of master's theses. The study by Phillips (58) was a pioneer study, for Canada, of methods of diagnosing difficulties in the fundamental operations in arithmetic.

Educational Psychology

McGregor (50) investigated the relationship between the self-concept and the ideal-concept in adolescents: The relationships found were moderately high.

Educational Sociometry

Two reports on theses were published: One, by Northway and Rooks (55), found that children of high sociometric status were more creative than those of low status; the other, by Northway and Detweiler (54), reported that children tended to perceive people in terms of their social value to them.

Guidance and Counseling

A mine of information was reported by Crombie (22, 23) and Crombie and others (24) in a follow-up study of *Your Child Leaves School*, wherein a two-year follow-up of students was attempted. The experiences and opinions of these former students were valuable to both counselors and counselees. Many of the factors affecting the predictive accuracy for university training of the senior matriculation examinations in Ontario were identified by Fleming (27), but he found a disappointing lack of statistical support for generalizations. Of the minor studies, Guest (33) attempted an evaluation of the system of counseling used in the Winnipeg, Manitoba, high schools; he uncovered evidence of a real need and also of a severe lack of adequate services. Clarke (15) surveyed promotion practices and policies in Alberta and found that the reasons for failure were lack of achievement, lack of motivation, and poor attitudes, the first-named being the most frequently mentioned. Roberts and Ackroyd (63) surveyed the postschool occupations of the 821 Alberta high-school students graduating in 1949; about half were subsequently enrolled in the University of Alberta. Solberg (67), in a similar type of study but at an earlier stage of the educational system, traced 1411 students of the Toronto public schools who wrote the high-school entrance examinations (abolished in 1950) in 1948. No significant relationships were uncovered, indicating that the examination was probably of little value.

Mental and Physical Development

Carried out under the auspices of the Canadian Red Cross Society, a very important and carefully controlled study of the possible effects of an excellent noonday meal on physical development and on school achievement was reported by Tisdall and others (69). Altho slight differences were observed, the conclusion reached was, "It is doubtful whether any of the differences were of practical significance." No particular comments on the implications of the study for school meals in general were made. Phillips (59) reported the results of a five-year survey of the physical and mental health of a large sample of children of school age.

Language Arts, Fine Arts, Natural Sciences, and Mathematics

Brother Luke (9) reported the results of a series of studies of the vocabularies of children conducted at the University of Montreal. Carrière (12) conducted one of the studies with French-speaking children attending the Separate Schools of Ontario. The interests of students in science were studied by Douchette (25) and Wilde (73). Studies of difficulties in English, including reading and spelling, were conducted by Lampard (43), Skuba (66), and Vandersteen (71). McKenzie (52) made an exhaustive survey of the teaching of English to non-English-speaking immigrants to Canada for the period 1899-1952 (which covered the major mass-immigration periods).

Research Methods

Griffin and Seeley (32) reported the results of an experiment using group-directed discussions with children, a research method not previously used in Canada. Their findings had particular application to the field of mental health. Fowler (28) applied a measure of item conformity (or item validity) to the problem of measuring person conformity, i.e., conformity to the group pattern.

Special Programs

Wallace (72) reported the findings of a very important experiment in nursing education, wherein the course was shortened and the nurses in training were not subject to emergency ward duty. More applicants enrolled, more nurses were graduated, and the results appeared far superior to those secured under the older type of training. Lampard (42) secured encouraging results in an experiment to improve the reading abilities of adults. Barrett (4) compared students enrolled in the two-year (terminal) and four-year courses in a commercial high school in Ontario: The terminal-course students appeared to be older and of lower learning ability.

Teacher Personnel

The studies reported were unrelated and difficult to classify. Bowers (5) reported the results of an extensive series of investigations in his own institution on the factors affecting success in practice teaching. Keddy (41) studied the selection procedures used at the Ontario College of Education. Katz (38) investigated the opinions of graduates of the University of Manitoba regarding the teacher-education program there. Clarke (14) and Clarke and McGregor (16) studied the relationships between teachers' adjustment and teachers' attitudes toward student behavior problems (maladjusted teachers seemed to understand the students better) and between adjustment and achievement of teachers in university courses (no relationship of practical significance was found).

Aikenhead (1) surveyed the attitudes expressed by young people toward teaching as a career, and Clarke and Pilkington (17), by questionnaire, endeavored to determine why teaching is chosen as a career. Gray (30) attempted to find criteria, methods, and devices which would assess a teacher's abilities in the school and in the community. Hardy (34) evaluated the *Minnesota Teacher Attitude Inventory* for use in Manitoba and found encouraging results. Johnson (36) traced changes in the concept of discipline and in pupil-teacher relations in British Columbia. Stein (68) found that prospective teachers with college degrees do not differ significantly from other college graduates in scholastic aptitude and academic success. Murray (53) tried to identify the annoyances and frustrations which cause Alberta teachers to quit teaching. The males apparently quit because salaries were too low and prestige was inadequate; and the single females, because of a heavy work load, lack of equipment and facilities, and poor living accommodation.

Summary

The experience gained in the development of research in Canada may be of more interest and value to researchers elsewhere than the actual findings referred to above. The absolute necessity of national avenues for publication is very evident in Canadian experience. Attention may be drawn to the apparent relationship between volume of research and ready access to mediums for dissemination of research findings.

This reviewer feels that researchers in other countries could with profit become acquainted with the findings of at least the following studies done in Canada: Canadian Broadcasting Corporation (10), Collins and others (19), Conway and Brown (20), Crombie (22, 23), Crombie and others (24), LaZerte (45), McKenzie (52), Phillips (58, 59), Renney (61), Tisdall and others (69), Wallace (72), and Young (74).

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Canadian Education: Canadian Education Association, 206 Huron St., Toronto, Ont.

For the Bulletin listed frequently, which is issued only in December:

University of Manitoba Faculty of Education Research Bulletin: Faculty of Education, University of Manitoba, Winnipeg, Man.

CHAPTER III

French-Speaking Countries: Belgium, France, Switzerland

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OBJECTIVE educational research in French-speaking European countries (France itself and the French regions of Belgium and Switzerland) has been conducted mainly by laboratories or experimental schools attached to institutes of higher education. It would seem, however, that the authorities are coming to appreciate the scientific concept of teaching. After the war, the French Ministry of National Education set up a *Service de la recherche pédagogique;* Belgium established the less ambitious *Commission consultative universitaire de pédagogie;* and for some time past the *Ecole Expérimentale du Mail* has worked in conjunction with the Geneva educational institutions and authorities.

By and large, however, educational research has been initiated by research centers rather than by authorities or the teaching profession; both groups still often favor intuitive instruction over experimental teaching.

These facts explain the diversity of the subjects treated. Several common trends emerge from what has been done in recent years: There has been a preoccupation with backwardness' in school and, in this connection, with questions concerning attainments in reading and spelling which are the most frequent causes of failure at the primary level; some research is beginning to make use of sociometric methods; and finally, certain experimental investigations have produced practical educational results, chiefly in the form of textbooks.

Until recently, research centers were isolated, but since 1953, annual meetings have taken place which may soon lead to the establishment of an organized unifying body. In addition, the French *Service de la recherche pédagogique* has founded a periodical, the *Courrier de la recherche pédagogique* (12), which gives an account of plans and experiments.

In Belgium, since 1951, Plancke of the University of Ghent has been publishing, under the title *Paedagogica Belgica* (74), regular lists of educational studies appearing in Belgium along with the subjects of university theses. Under the direction of Buyse, the *Laboratoire de Pédagogie Expérimentale* of the University of Louvain started to issue in 1955 a series entitled *Documents de Psychologie Scolaire*. Finally, the Swiss National Commission for UNESCO, with UNESCO's assistance, organized a regional seminar which enabled delegates from 15 European countries to consider their programs, their ideas, and their achievements. A general report was prepared by Dottrens (32).

Administration

The most vital questions have concerned the extension of compulsory education and the direction to be taken by post-primary studies. As far as Belgium is concerned, opinion now favors the principle of a supplementary one- or two-year period. In 1952, a public opinion poll (49) showed 77.86 percent in favor of such extension and 15.75 percent against. Moreover, an inquiry carried out by the School of Sociology in Liège University (16) which surveyed all children who had completed the sixth primary year[1] between 1945 and 1949 showed that 70 percent of them continued their studies in various types of schools. But in France and in Belgium agreement is far from having been reached as to the new structure which should be given to education. An inquiry carried out by the *Centre regional de documentation pédagogique de Rennes* (12) revealed that many teachers favored the creation of a common group of prespecialization classes resembling the American junior high schools; but, against this, it would seem that public opinion is far from agreeing to this reform. Thirty percent of the persons questioned during a poll carried out in Belgium wanted the same instruction for one and all while 62 percent wanted specialized teaching from age 12 on (49).

De Coster (21, 22), director of a school group comprising a thousand pupils ranging from six to 21 years of age, set out the principles and the results of transforming the school atmosphere on a democratic basis. His system comprises a preparatory stage for pupils from six to 14, self-government thru class committees from 14 to 18 years and, over 18, collaboration with the school authorities and the teaching staff, the shouldering of individual responsibility and social service. A council of seniors endeavors to preserve the school spirit; teachers elect an administrative board which cooperates with the directors.

Curriculum

During the last five years there have been relatively few objective activities primarily devoted to examining study programs. Some research has been done to establish the level at which such forms of speech as the pronoun, the descriptive adjective, and conjunctions may be acquired (17).

A particularly interesting investigation was undertaken simultaneously in Geneva and Brussels on knowledge of the agreement of the past participle (40, 76). It comprised three tests dealing with each of the cases and given to pupils from the sixth to the tenth year. If the cases of the past participle used alone or with the verb *être* are learned in the later years of primary school, the authors of the tests believe that the rules governing the agreement of the past participle used with *avoir* should come up only after the sixth year of primary school.

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[1] In order to standardize terminology relating to class levels, designations similar to those used in the United States have been employed thruout this article. The first year of studies groups children of six to seven; the second, seven to eight; the third, eight to nine, and so on.

Having checked attainments in the spelling of conjugations (75) among Geneva pupils from the fifth to the tenth year, Roller recommended a program based simultaneously on the principle of gradually increasing difficulty and on the frequency of use of verbs according to the Aristizabal scale. This work later formed the basis for publication of tables of French conjugations (77) issued under the aegis of the Geneva Department of Public Education.

Mialaret (63) drew attention to the importance of introducing qualitative ideas of comparison in arithmetic at the beginning of primary school, and Jadoulle (50) published a questionnaire intended to establish whether pupils at that level have mastered these concepts. A group of secondary mathematics teachers (62) checked to what extent pupils in the sixth- to eleventh-year classes could make accurate calculations involving fractions; even at seventh-year level (where the subject has been retaught) the results were far from satisfactory. These facts raise the question of the value of such concepts in the curriculum and justify the use of practical exercises designed to consolidate the subjects taught. Mortier (70) showed drawings representing elementary geometrical forms to pupils of the sixth, seventh, and eighth years; he observed that in most cases the utilization stage was far from being reached in the sixth year and concluded that the teaching of these subjects should be postponed until after the primary level.

Mialaret (61) tested pupils from the second and third years and established the percentages for completion of single-operation problems. Questions for which the correct solution involved no more than the simple condensation of material experiences with familiar objects are readily grasped from the second year; but problems involving knowledge of certain economic or social concepts (such as profit), implying a division relationship or requiring a step back in time, were completed in only 30 to 40 percent of the cases.

Educational Measurement

A complete survey of the increasingly important production of means of measuring educational attainments objectively is outside the scope of this chapter; moreover, since many of the tests are prepared by official bodies, they are not sold commercially but are restricted to school psychologists and vocational guidance workers.

Among the published tests the most varied range is found in spelling: Tests are available for ordinary spelling (39) at the primary level, or for grammatical spelling from the third to the ninth grades (55, 78). Bonnardel (3) has developed a reading test in French which enables an estimate to be made of the abstract verbal understanding of students at the secondary or university level. Diagnostic arithmetic tests (86) concerned with the second to fifth years have been published for the first time in French. The examinations held at the end of the primary course are becoming progressively more objective and are taking the form of standardized batteries comprising not only intelligence tests but also graduated questionnaires to supply estimates of progress in the mother tongue and in arithmetic and sometimes providing indications of pupils' knowledge in other fields (87). The use of intelligence tests in conjunction with examinations is growing, and teachers welcome this as a safeguard against unfavorable judgments being passed on their work should school results be poor (51).

Bonnardel (4) conducted several investigations aimed at comparing results obtained by pupils in various branches; for example, the application of factor analysis enabled him to establish the emergence of a sharp distinction between the scientific and literary fields of study from the fourth lycée year (eighth year). Traditional examinations and tests of scholastic attainments have likewise been compared. In the selection of officer cadets, Delys (28) obtained prediction coefficients in the region of 0.6, that is to say, equal to those usually obtained from examinations and, in the case of mathematics, even higher. Gilbert (38) compared the data from tests with school results in Classes VII, VIII, and IX, obtaining prediction coefficients at least as high as those provided by examinations (about 0.5). She believed, however, that indications provided by tests facilitate a more objective analysis of the pupils' work. Bonin (2) studied the intelligence of children in the sixth year of school.

Educational Psychology

Physical, psychological, and social data on pupils in the preparatory classes of a teacher-training school for boys were collected by De Coster and Goosens (23). These were compared with school results with a view to determining variations in educational behavior during puberty. The authors concluded that this physiological change often involved temporary maladjustment but only rarely led to serious educational disturbances.

The most extensive research in the French language was sponsored by the *Institut national d'études démographiques de France* (48). One hundred thousand children from six to 12 years of age took Gille's nonverbal mosaic test, and scholastic, social, and family data concerning them were obtained. The results were interpreted by the authors after correction and statistical treatment. Specifically, they related variations in score to father's professional standing and local population density. The lowest average figures were found among the families of farmers and farm laborers. The average test score was lower in the case of large families. Where the father's profession had required a university training, however, this fall was very slight, being much more marked among workers and farm laborers. Special studies were made of twins and left-handed children and the influence of these factors on their intellectual level. In the case of children obtaining the best results, the value of the tests in predicting a successful school career was analyzed.

Educational Sociology

Nielsen (72) reported an experimental study of the evolution of the social sense in child activities. The children were set tasks whose satisfactory accomplishment either necessitated or was facilitated by cooperation. Four stages in behavior were noted: up to three or four years of age, a nonsocial stage in which the child is indifferent to what others are doing; from three or four to seven or eight years, a presocial stage in which the child is attracted by what others are doing but is debarred from cooperation by its egocentricity; from seven or eight to 13 or 14 years, a stage where partial but increasing efforts toward mutual adaptation are observed; finally, a stage involving the conscious organization of social activities.

The results of group or individual learning of nonsense words have also been compared (68). As a general rule, group work is more effective altho certain individuals may upset or weaken collective activity. On the other hand, the attainments of highly intelligent individuals are lessened by cooperative work.

Burstin (8) studied certain aspects of socio-moral evolution by analyzing children's expressed wishes. Socio-moral concepts are at first schematic, rudimentary, and aroused by immediate needs unrelated to the social structure. During adolescence, desires are more closely in touch with reality, and material, social, and moral factors are seen to be interdependent.

Sociometric methods have been used increasingly in recent years. After establishing individual sociograms for pupils of a secondary class (Grade IX), Mialaret (65), in particular, suggested a method of treating individuals rejected by the group and who consequently often lack self-confidence. Husquinet (46) supplemented sociometric data with a thematic apperception test given to pupils of Grades VII to IX and applied the information obtained to problems of school and family adaptation. Bastin (1) compared the results of a sociometric test with the teachers' own observations.

In Belgium, De Coster and Van der Elst (24) made a special study of the phenomenon of individuals rising in the social scale by means of education. They noted that the desire to rise in the social scale by means of education is one of the most potent factors making for social mobility and that it is most often met with in small families. It is very difficult to achieve, however, and in fact can only be achieved by very few people.

Even then it requires two, three, or four generations, in spite of the fact that contemporary society is said to be based on an open class system. The main obstacles are the lack of selectivity in primary education which raises false hopes in parents, especially as Belgian secondary education is highly selective; family finance; lack of suitable guidance; absence of a cultural background in the home where education is primarily considered as a means to future economic advantages; the pupil's psychological isolation between the mediocrity of the family environment and the higher social circles which he is seeking to enter; finally, resistance on the part of those upper classes by whom the student wishes to be accepted.

Guidance and Counseling

School psychology services are still in the experimental stage in French-speaking countries altho the oldest has been operating since 1928 (50). For this reason there is a lack of uniform practice. Some services are simply attached to one large school, others to several institutions, while still others take the form of out-of-school advisory bodies. Similarly, their activities vary. In some cases they are confined to giving group tests on which educational guidance is based; in others they include the standardization of examinations, the discussion of educational problems with teachers, and the study of individual difficulties (50). Some centers even treat cases of maladjustment (58). The records of the *Journées internationales des centres psycho-pédagogique de langue française* (11) give some idea of the great variety of these activities.

The documentation collected by these services provided material for much research of general interest. Derivière (30) paid special attention to the vocational interests of school children.

Elsewhere (29) Derivière studied the extent to which the chief physical defects observed affect secondary-school pupils' chances of success. Various inquiries were made into methods of studying problems of affectivity and child personality by character analysis (52), graphology (27), projective technics (31), and methodical observation (34).

Van Waeyenberghe (88) used long-term checks to establish the predictive value of a general knowledge test given for guidance purposes to pupils entering secondary schools. He divided the sample at percentiles 90, 75, 50, 25, and 10 and noted that the first three years were passed successfully by 75, 25, 6, 2, and 0 percent of the pupils respectively. The only pupils completing the sixth year successfully were in the upper 25 percent. By analyzing statistical data (60), it was possible to establish the frequency of failures in each year and to define some of the factors making for backwardness such as the absence of any transition period prior to entry into primary school, unfavorable social and economic conditions in the family background (94), and unsuitable guidance at the beginning of secondary-school education (26). Some attention was given to diagnosis and treatment of scholastic failures (53) and to handicapped children (85). Lastly, some research workers who concentrated chiefly on retarded and maladjusted children observed that their weaknesses are more evident in the field of words and abstract ideas than in the practical application of intelligence (45).

Mental and Physical Development

A longitudinal study by Brunet (7), altho dealing with preschool situations, threw some light on the influence of environment on mental development during the first years of life. The author followed the evolution of children between the ages of six months and three years brought up either by intellectual families, working-class families, or paid foster mothers. All three groups consisted solely of normal, healthy children and were initially at the same average stage of development. From 12 months onwards, babies in the charge of foster mothers showed marked backwardness which the author attributed to the fact that they were left in bed so that their foster mothers could more easily proceed with their household tasks. As a result, these children received much less educational stimulus and, of course, their postural development was particularly retarded. From two years onwards, the average mental level among children of intellectual families exceeded that among working-class children even tho the latter were given just as much attention by their parents. According to Brunet, the distinction is attributable primarily to the more advantageous circumstances provided by university graduate parents, including more varied and better organized linguistic contacts, toys encouraging more activity on the part of the child, and wider human relationships.

A certain amount of detailed research has been conducted into the evolution of thought processes and the formation of concepts (10), criteria for the classification of objects (89), comparison and abstraction (84), and the influence of earlier patterns on the thought structure of children and adolescents (25).

Much research has been carried out on drawing. Naville (71), going back to its origins, believes that line first grew out of the splash of color, while Zazzo (92) studied the relationship between the graphic gesture and the structuring of space. Boussion-Leroy (6) noted attempts at perspective during the transitional years and studied the extent to which intellectual backwardness in children is linked to the persistence of traces of "transparency" in drawing.

The most recent works of Piaget and Inhelder aim at discovering how, genetically, human thought introduces a certain order into the multiplicity of phenomena and events. Their work plan is similar to that of their previous work: Experiments often of a most ingenious kind are followed by an interview based on clinical methods, leading the individual to explain the phenomenon and foresee the results of future experiments and establish a law. A first book (73) studied the way in which children acquire the concept of chance and seek an explanation if any given result recurs constantly. A second publication (47) set out to examine the different stages in the establishment of laws and the determination of causes in the case of the most complex mechanical, physical, or chemical problems.

Motion pictures received considerable attention from research workers, who studied the way in which screen situations are interpreted by children of kindergarten age (90) as well as by older children (41). The influence of the cinema on children and adolescents was examined (43). A vast inquiry, directed by Zazzo and Zazzo (91), was undertaken by the International Children's Center, in cooperation with the *Institut de Filmologie* of the University of Paris. It was conducted in connection with an international competition for children's recreational films during which 50 films were viewed at 120 screenings by 1473 schoolboys and schoolgirls. The films were sifted out progressively in accordance with the votes of the children, who were then asked to defend their choice. Various methods were used to observe the children's reactions during the screening of the films. The most important conclusions as to the children's preferences were as follows: (a) With increasing age greater prestige is attached to live actor films (as opposed to cartoons). (b) The tastes of girls and boys diverge increasingly as they grow older. (c) Children, especially if interested in what is happening on the screen, pay little attention to technical aspects of a film, tho sometimes they are moved by beauty. Leroy (54) observed individually 222 children between the ages of four and 14, during the screening of a comic film, with a view to noting their interindividual relations. The frequency of such contacts rose suddenly in the seven- to eight-year-old group from an average of 3.9 to 6.1 in 22 minutes. The author of this work concentrated chiefly on the evolution of the psychological significance of these phenomena according to age, relating them to stimulation, companionship in emotional reaction, and agreement or disagreement.

Finally, some research has been conducted into the psychology of children placed in special situations. Zazzo (93) studied the intellectual level of twins, for example, and Van Roy (85) investigated the problems of handicapped children. The latter were given the *Rosenzweig* test in conjunction with a clinical examination. They were found to be less able to defend themselves but showed a greater sense of responsibility. Such children suffer most from their lack of physical freedom and future prospects. Their most frequent reactions denote chiefly a great need for affection and, in some cases, a certain aggressiveness, with domination or compensatory behavior in other fields. The author's pedagogical conclusions related mainly to the educational environment that should be built up around them. They should be treated in such a way as to give them the impression that they are normal, and should be surrounded at the same time by a healthy atmosphere of confidence and friendliness.

Problems of Methodology

Language Arts

Much research work has been devoted to the psychology of reading and to dyslexia, including the special difficulties encountered by dyslexics. These seem similar to those encountered by normal individuals, but they are overcome more slowly or, in some cases, not at all. With regard to the causes of these difficulties, apart from retarded intellectual development, the tendency is to blame chiefly left-handedness (37), language problems (5), and occasionally inadequate perception of time (83). Simon (81), after applying *Head's* laterality test and a form of the *Kohs-Goldstein* test, pointed out the role of space perception and the analytical relation of the written to the spoken language. Re-education may be by various methods: Certain writers recommended a semiglobal syllabic method (80), while Chassagny (15) insisted on going back to the beginning and analyzing words into letters and syllables. He also advocated the constant comparison of syllables likely to cause confusion and the acquisition of a sound knowledge of left and right.

A commission set up by the French Ministry of Education, under the direction of Gougenheim of the University of Strasbourg, produced a textbook on elementary French (66) designed to facilitate the rapid acquisition of the spoken language. This work is based on the following data: (a) a word-frequency list drawn up on the basis of 163 recorded conversations and (b) a list of important concrete terms (available vocabulary) used in special circumstances (e.g., *jacket, bus*) and selected from vocabulary relating to 16 centers of interest in four different regions. This list, in addition to its 1138 terms, includes the grammatical rules which an analysis of the conversations had shown to be the most important.

Simon (82), after summing up the experimental data relating to spelling, went on to study certain psychological and educational factors contributing to failure in this subject. He derived from this study the general outline of a teaching method and also published for children from the second to the sixth year of school a test in the form of a continuous dictation text which indicates separately the norms for the observance of rules, usage, and phonetics.

Certain educators concentrated on observing the efforts of children at the beginning of the secondary-school course to overcome various difficulties encountered in mastering language. Attention was drawn to the largely mechanical methods used in grammatical analysis by pupils in their first year of secondary school (13), their weakness in exercises designed to show the general understanding of a text, and the transitional stages they pass thru between grasping a literal meaning and understanding a figurative one (14).

Mathy established a basic Latin vocabulary (57) based on word frequencies in texts recommended for secondary schools and produced from it a practical school vocabulary (56). Gal, taking Mathy's work as his starting point, and applying his own concepts of methodology, published a Latin textbook for beginners (35).

Mathematics

The *Commission consultative universitaire belge de pédagogie* (18) endeavored to draw up an objective scale of difficulties in division in written arithmetic. On the basis of the percentages of errors in 105 operations done by 10,835 school children from the fifth to the eighth years, it suggested 21 degrees of difficulty and was also able, by means of a partial analysis of the results, to discover the most common types of errors made. Among the Commission's most significant findings was the fact that the operational technic has already been acquired by children in their fifth year where 73.4 percent had fewer than 20 percent of the problems wrong. Thirty-five percent of the errors made in division were due to technical faults in the partial substractions and multiplications involved, 32 percent to incorrect estimates, and 15 percent to the wrong use of the zero. Only 10 percent of the mistakes made resulted from ignorance of the technic of division.

A team of educational psychologists in Paris (19) interviewed children between the ages of 11 and 13 with a view to discovering their difficulties in relation to arithmetical problems. The most common mistakes were due to a failure to understand the problem from a practical point of view and an incapacity to set down the correct mathematical relationships corresponding to its elements. Very few children were able to correct a mistake of their own accord once they had made it. After having given group problem tests to children between the ages of eight and 14, de Moraes (69) recorded some of the best and some of the weakest pupils, as shown by the test, while they thought out the solutions of problems aloud. Among the chief weaknesses characterizing those who failed to find the correct answer, she noted the syncretic reading of the text of the problem, the failure to grasp situations outside their own experience, rigid thought processes incapable of returning to the data in the event of difficulty, and lack of skill in the application of rules prematurely learned.

Mialaret (64) gave a class a questionnaire to answer before and after a traditional type of lesson on the area of a parallelogram. This traditional type lesson, with individual manipulations suggested by the teacher, was considered excellent by six competent judges. Little progress was observed, however, when the pupils were asked to apply what they had learned to actual figures. Mialaret believes that children's psychological capacities are overestimated and that they should be allowed to exercise more initiative in discovering facts for themselves.

Very little has been published recently on the teaching of mathematics by demonstration. Monavon (67) drew attention to the slow progress made by pupils in acquiring accurate vocabulary and learning symbols.

Hotyat (44) made a classified list of school children's mental difficulties in understanding and reasoning out demonstrations in arithmetic, algebra, and geometry.

Social Studies

Inquiries in this field have produced rather disappointing results. Gal (36) asked children questions designed to show their understanding of terms (e.g., *to beat a retreat, to reach a majority decision*) used in history textbooks and discovered that many were not understood by the children for whom the books were intended. Civic knowledge tests (79) applied to recruits in Geneva showed a progressive falling off in knowledge as the questions moved from subjects relating to the state to those relating to local government.

A study of the results produced by the activity method of teaching history, based on the pupils' use of texts and papers of the period studied, was undertaken by Gal (36). Altho it requires much time, this method is always advantageous, provided the documents used can be understood by the children and are of sufficient general interest. The author concluded that, given a lighter curriculum, such a method of teaching history might well produce satisfactory results.

Cultural Background

The International Children's Center recently carried out research on a vast scale to discover the results of the regular provision of the means of culture to children in isolated rural areas (59). Widespread samplings carried out in several countries had shown that school children in rural areas constantly obtained results in intelligence tests and school examinations inferior to those obtained by city children. The inquiry was designed to determine whether these poor results were due to the low cultural level of the children's cultural environment which perhaps provided too little educational stimulus. With the object of verifying this hypothesis, school children in 12 schools in the Brie region, particularly poor from the cultural point of view, were provided regularly for two years with abundant means of acquiring a cultural background: a well-stocked children's library, educational films, exhibitions, concerts, and regularly changed sets of art reproductions for the classrooms. A team of specialists had the task of making the best possible use of this material. Psychological surveys carried out before and after the experiment by the Paris Child Psychology Laboratory showed that in spite of the short time the experiment lasted, the school children "brought into contact with a wealth of new cultural material were rapidly aroused and displayed reactions similar to those of children in more favorable environments, that is to say joy at having their curiosity satisfied, pleasurable anticipation and the demand for more knowledge, and a rapidly growing awareness of the possibilities of life and the world around them." In from it a practical school vocabulary (56). Gal, taking Mathy's work as his starting point, and applying his own concepts of methodology, published a Latin textbook for beginners (35).

Mathematics

The *Commission consultative universitaire belge de pédagogie* (18) endeavored to draw up an objective scale of difficulties in division in written arithmetic. On the basis of the percentages of errors in 105 operations done by 10,835 school children from the fifth to the eighth years, it suggested 21 degrees of difficulty and was also able, by means of a partial analysis of the results, to discover the most common types of errors made. Among the Commission's most significant findings was the fact that the operational technic has already been acquired by children in their fifth year where 73.4 percent had fewer than 20 percent of the problems wrong. Thirty-five percent of the errors made in division were due to technical faults in the partial substractions and multiplications involved, 32 percent to incorrect estimates, and 15 percent to the wrong use of the zero. Only 10 percent of the mistakes made resulted from ignorance of the technic of division.

A team of educational psychologists in Paris (19) interviewed children between the ages of 11 and 13 with a view to discovering their difficulties in relation to arithmetical problems. The most common mistakes were due to a failure to understand the problem from a practical point of view and an incapacity to set down the correct mathematical relationships corresponding to its elements. Very few children were able to correct a mistake of their own accord once they had made it. After having given group problem tests to children between the ages of eight and 14, de Moraes (69) recorded some of the best and some of the weakest pupils, as shown by the test, while they thought out the solutions of problems aloud. Among the chief weaknesses characterizing those who failed to find the correct answer, she noted the syncretic reading of the text of the problem, the failure to grasp situations outside their own experience, rigid thought processes incapable of returning to the data in the event of difficulty, and lack of skill in the application of rules prematurely learned.

Mialaret (64) gave a class a questionnaire to answer before and after a traditional type of lesson on the area of a parallelogram. This traditional type lesson, with individual manipulations suggested by the teacher, was considered excellent by six competent judges. Little progress was observed, however, when the pupils were asked to apply what they had learned to actual figures. Mialaret believes that children's psychological capacities are overestimated and that they should be allowed to exercise more initiative in discovering facts for themselves.

Very little has been published recently on the teaching of mathematics by demonstration. Monavon (67) drew attention to the slow progress made by pupils in acquiring accurate vocabulary and learning symbols.

Hotyat (44) made a classified list of school children's mental difficulties in understanding and reasoning out demonstrations in arithmetic, algebra, and geometry.

Social Studies

Inquiries in this field have produced rather disappointing results. Gal (36) asked children questions designed to show their understanding of terms (e.g., *to beat a retreat, to reach a majority decision*) used in history textbooks and discovered that many were not understood by the children for whom the books were intended. Civic knowledge tests (79) applied to recruits in Geneva showed a progressive falling off in knowledge as the questions moved from subjects relating to the state to those relating to local government.

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Research Methods

The requirements of research and of university teaching have led to a certain specialization of educational research centers, but this subdivision of work has gone on in different ways arising out of the great variety of different needs. Child psychology clinics dealing with educational questions, university centers with purely academic interests, school psychology services, official research bodies working on the improvement of educational attainments at school, and re-adaptation centers cannot readily overlook the purposes for which their work is destined. Thus scientific pedagogy was faced by several different trends. Dottrens (33) remained faithful in general to experimental education as such, according to Buyse's definition in his classical work on the subject (9), where the latter summed up the aims of the science of education as follows: the rational organization of work, the evaluation of school attainments, and pedagogical experimentation. These were the main fields in which Mialaret's research (62) sought to use more scientifically rigorous methods in order to raise the prestige of objective pedagogy in the eyes of teachers and of the authorities.

Specialists working on practical educational problems, however, tended to take a wider view of the subject. Debesse (20) believed that research of a statistical nature should be accompanied by the objective study of individual cases without going so far as to lay down a hard and fast typology. This leads at once to the association of psychological problems and data from the family environment with information of a purely educational nature. Gratiot-Alphandery (42), speaking of the work of the school psychologist, said that he must bring to his work the rigorous methods of measurement and the objectivity acquired in the laboratory; at the same time his mind must remain open to the new points of view and the new methods of reasoning which he discovers in the school. Above all, he must beware of artificial situations brought about and falsified by the exigencies of excessive experimentation. This writer believes that the value of educational experimentation would be considerably lessened were it to be dissociated from the human beings for whose benefit it exists.

De Coster and Goosens (23) endeavored to reconcile all these different positions in their theory of complementarity, according to which educational reality cannot be grasped by considering problems from a single angle. Experimental pedagogy provides the pedogogical aspect of the problem, but it must then be studied in its psychological aspects. Finally, its social aspects must not be neglected if it is to be solved satisfactorily, and the pupils' family and social circumstances must be investigated.

Summary

The contributions to research outlined briefly here are still on a modest scale, but they reflect considerable progress, both in quality and quantity, over previous periods. The greatest weaknesses are in the field of secondary education and in the fact that, largely owing to the isolation of research bodies, there is little coordination of their work. As has been seen, contact has now been established between centers, but the authorities are not yet sufficiently convinced of the value of objective research in education to provide these bodies with the means of studying all the problems raised by the increasing desire to improve educational achievements. Nor are they prepared to take the necessary steps to make teachers aware of the value of research by reorganizing teacher-training courses, still imbued to a large extent with empirical and intuitive principles.

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CHAPTER IV

German-Speaking Countries: Austria, the German Federal Republic, and German-Speaking Switzerland

MARCEL MÜLLER-WIELAND

THE revolutionary transformation of contemporary life has brought about a considerable amount of educational research in German-speaking countries. We shall limit ourselves to the consideration of some 150 works, of the 1000-odd on the subject published during and since 1950, which reflect prevailing thinking about contemporary problems of culture and the main tendencies of educational endeavor. Articles published in periodicals had to be dispensed with almost entirely.*

Administration

Hylla and Wrinkle (59) prepared a survey of the school situation in Western Europe. Hylla and Kegel (58) published in English an introduction to the school situation in Germany. The permanent commission of the Ministers of Education of the Lands of the German Federal Republic released a report on the evolution of the school situation since World War II (16). Froese (31) dealt with the evolution of German legislation. Heckel (42) wrote about the legal status of German private schools. In the foreground of school policy lay the question of the merging of public schools with the professional schools, the introduction of a ninth year of public school (21, 105, 135), lowering entrance requirements for upper-level schools, and the question of the cross relations among the individual school plans (30). Regarding advanced-school and high-school reforms, the introduction of a general course of studies was requested (98). Rüegg (96) investigated the ideological and sociological presuppositions of the general course of studies and German high-school reforms. He demanded that investigators work more closely together and urged that the structure of the high school be modified. The connections between professional activity and high-school instruction were investigated by Schaefer (97). He brought to light the lack of academic professional research and knowledge. Flitner (29) urged that student associations be revived.

The organization of school activity in Switzerland was described thoroly in *The Archives for Swiss Educational Activity* (111) as well as in the yearbook, *Switzerland* (110). Bosshard (9) dealt with the legal status of

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*Nearly half of the author's original manuscript was devoted to a survey of developments in educational history and philosophy. Unfortunately the scope of this issue and limitations of space made it impossible to publish this material here. The author's original emphasis probably reflects more accurately than does this chapter the educational interests of German-speaking countries. T. A. L.

Swiss public schools. Herzfeld (45) published a report on educational activity in Switzerland. Wymann (140) reported on plans for the reorganization of the upper level of public schools in Zurich. Näf (81) wrote a valuable essay about the function of the university.

Duss (18) treated the organization and legal status of Austrian state schools. The Vienna Board of Education released an instructive report on the school situation in Vienna (137). Lang (73) examined school organization, particularly that of country schools. Pöschl and others (90) dealt with the second grade and the plans to reform it. Mayer, Meissner, and Siess (76) provided a historical survey of the development of intermediate schools for girls. A report on the problems of school construction was published in conjunction with the second Country School Congress in 1952 (72).

Curriculum

In the effort to reorganize curriculums, three aspirations were evident: (a) a decrease in the number and a concentration of the subjects taught; (b) a new selection of subjects to meet the requirements of exemplary close-to-life and formative instruction; and (c) the creation of integrated subjectmatter areas which might serve as a basis for over-all instruction, period instruction, and group instruction.

Particular effort to arrive at integration of work was made in the case of the upper grades of public school. The plans proposed by Ebel (20) and by Krieck and Wilker (67) were aimed at achieving this result, as were the essays of Bergner (6) and Neuber (83). Hazmuka (40) drew up complexes of subjects for the first and second grades, in which the seasons contribute to the choosing of subjects. Fenzl (26) suggested weekly plans with unified themes. Lang (73) recommended that a distinction be established between essential subjects, made compulsory, and marginal subjects, which could be freely elected. Stieger (116) developed a theory of the school program for active instruction. He suggested a decrease in teaching load in order that the child's potentialities might be developed fully.

Concerning the selection of subjects, Huber and Prestel (55) insisted on giving up complete and systematic instruction. Wagenschein (131) suggested that subjects be narrowed in advanced schools.

In all curriculum planning, the tendency to replace minimum programs by more comprehensive coordinated work is apparent.

Educational Measurement

In a noteworthy essay, Kern (62) showed that a large percentage of elementary-school pupils did not fail in school primarily thru lack of ability but because they had entered school too early. Kern's basic performance test served to determine school maturity. In Switzerland, Strebel (119) worked out a combined school maturity test. To this end, she made use of the already tested methods of Binet-Simon, Bührer, Hetzer, Danziger, and Winkler.

Simoneit (112, 113) uttered a sharp protest against numerical evaluation of the student's work. Instead of such quantitative judgments, he advocated evaluative descriptions of the student's achievements and personality.

The Austrian Ministry of Education brought out a blank for student observation in Austrian public schools. Its purpose was to supplement test results with information about the environment, the psychic and physical constitution, and development of the child. Lang and others (74) furnished valuable directives to teachers on how to use these blanks; Spiel and Birnbaum (114) described the blank's development and use. Holzinger (53) undertook to determine the actual performance of students in a representative cross section of schools in Styria. Analysis of these statistics revealed that the students performed best in strongly structured schools. Boys proved to be better at arithmetic; girls, at spelling. The classifications established by the teachers only partly agreed with the test results.

In Switzerland, Stieger (116) drew up a written certificate, to be delivered at the conclusion of elementary schooling, providing information about the character, mental and physical development, working behavior, and special aptitudes of the student. Pally (85) made valuable suggestions concerning the cooperation of teachers, school psychologists, and parents for the purpose of selecting students.

All these proposals suffered from the fact that the schematic nature of the observation blanks made the clear understanding of fluid child behavior more difficult; the blanks did not do justice to what is specifically important in each individual student. Thomae (123) recommended dynamic and free judgment of personality on the basis of daily observation. He reacted against the schematic nature of all questionnaires.

The effect of the usual method of selection on the educative process and the mental attitude of students at all levels has not yet been investigated sufficiently from the viewpoint of psychology and educational theory. Such an investigation would no doubt bring out the necessity of revising our way of understanding and judging students.

Educational Sociology

The study of sociology of education received new impetus during the past few years thru the influence of American research on the German language literature in the field. Naturally, few publications of importance have as yet appeared. The edition of Fischer's complete works (27) led to the publication of his basic remarks on the science of educational sociology and its distinction from social philosophy and social theory of education. Contributions to the sociology of school classes and work groups were made by Engelmayer (23) and Weiss (133). Weiss presented valuable reflections on the atmosphere of the class, its sociological background, and its influence on the student's attitude. His discussion of the method of sociometric tests, sociometric computation, and sociograms is highly instructive. Finally, Beck (4) conducted interesting experimental investigations on the understanding of social problems in family and school.

Guidance and Counseling

No comprehensive theory of guidance along the line of individual understanding and counseling of the student to help him select his course of studies and his profession has as yet been laid down altho the need for student orientation has constantly become more urgent. Monographs to date have dealt with aid to education and youth welfare, with the theory of psychological guidance, and with professional orientation.

Hanselmann (38) gave valuable advice concerning older students and young apprentices. Schulz (108) published a report on voluntary educational assistance. Zehetner (141) brought out a manual on youth welfare assistance. Becker (5) published a manual about Catholic youth assistance in Germany.

Fank (25), Hetzer (46), and Spiel and Birnbaum (114) made notable contributions in the field of mental health. Among the numerous works about professional guidance, mention must be made of the guide to professional information put out by the Vienna Rural Labor Office (70) and the professional guidance handbook for young girls by Schaeffer and others (99). A contribution on the subject of choosing a profession was made by Hoppe (54). To facilitate school and professional orientation, Arntzen (1) produced a test battery which is in part projective and in part deals with factual material. Its advantage lies in the variety of the types of tests used; its limitation, in the overemphasis of the intellectual element and in the great amount of time (7-8 hours) required to complete the tests.

Mental and Physical Development

A good description of the development of the human body was given in Huth's outline (57) of educational anthropology. The careful elucidation of fundamental principles, the thoro theoretical presentation of the methods of anthropological measurement and description, and the introduction to the technic of anthropological judgment make this work particularly appropriate for the education of teachers.

A valuable contribution to child psychology was made by Müller-Eckhard (80). This subtle presentation made one aware of the conflicts and the blocks in the development of child life and brought to light those aspects in ideal of achievement characteristic of our time that are hostile to the child. Particularly significant were Piaget's (87, 88) experimental investigations on the conception of time and its origins in the child's universe as well as the development of the capacity to pass moral judgments. On the basis of examinations and of observations of the free play of children aged six thru 12, Piaget reached interesting conclusions concerning the parallelism of moral and intellectual development. Certain aspects of the child's soul were revealed by Pfahler (86). Relying on depth psychology, Zulliger (144) investigated the child's conscience. Schaffner (100) examined the nature of the child's play and phantasy. Hetzer (47) studied the choice of toys with respect to the meaning of child play. Scheuerl (102) attempted to furnish a basic phenomenological explanation of play.

The study of adolescence received especial attention in the last few years. Busemann (14) provided a new, highly incisive treatment of the subject. The significant work of Tumlirz (129) furnished an over-all presentation of the psychology of adolescence. It sought to give a universally valid description of the process of maturing and offered interesting insights into the second spite phase, the adolescent's conquest of his personal world, and the typology and pathology of forms of maturing. Schweingruber (109) wrote a lucid treatise on the psychology of puberty.

The problem of accelerated development received the greatest amount of attention. On the basis of the investigations of Koch and Bernholdt-Thomsen, Kroh (69) saw in the attainment of maturity at an earlier age and in the acceleration of the maturation process a phenomenon characteristic of our time. Lang (71) based his request for a new type of school on the presentation of the biological-psychic and social transformations in the development of the adolescent. He saw a symptom of acceleration, particularly among well-to-do city dwellers and intellectually exigent people, in the increase in the weight and size of newborn children and in the increased speed of physical growth. He pointed to the following educational consequences: the increase of premarital sexual relations, the discrepancy between intellectual schooling and actual mode of life of the student, and wide differences in degrees of development among students of the same class. Prohaska (92) published the interesting results of the seventh Session of the International Salzburg Congress. In it, on the basis of a comparison of old and recent investigations, Viethen pointed out the increased physical growth and the accelerated sexual maturity of children in our time; he showed that the acceleration of physical development was accompanied by a slowing down of spiritual development. Using three large-scale aptitude tests applied to 13,000 adolescents from all parts of Bavaria, Viethen presented evidence that aptitude had regressed by 4 to 5 percent as compared with the prewar period and that a shift of aptitude had occurred toward the organizational-practical. Ability to understand decreased by 19 percent. In the same volume (92) Asperger reported on difficulties in concentration experienced by children; he related the difficulties to intellectual overstimulation and to overabundance of subjects taught. He also indicated that there has been a rapid increase in the number of organic cerebral ailments. The etiology of development acceleration opens important areas to future research.

Language Arts, Fine Arts, and History

Hillebrand (52) investigated the psychology of language instruction. He furnished valuable indications about the creative synthesis of the sound structure and meaning content of language revealed by the inner form of language; valuable, too, were his comments on the change of action phases and quality phases in linguistic development. The psychological foundation of active language acquisition deserves attention. Books by Dzimirsky and Sernko (19) and Essen (24) dealt with the general methodology of native language instruction. Hugelshofer (56), Kern and Kern, (63) and Dohrmann (17) advocated using the "total" method in elementary reading instruction. New possibilities were made available for elementary reading instruction by Tille and Tille (125), who combined the synthetic and analytic reading methods, thereby avoiding the partiality of the extreme Lautie and "total" methods. Heuberger and Hofmann (48) experimented with the use of group instruction for the teaching of the mother tongue. Strobach (120) urged that linguistic instruction be adapted to the requirements of modern schools. Tille (124) and Gebhardt (34) described a method of instruction by essay writing. Winkler and Essen (138) published a comprehensive guide to German speech education. Trojan (126) drew up a study program for the art of recitation. Ulshöfer (130) published a compendium of numerous types of instruction in German.

Glinz's attempt (35) to establish a new German grammar constituted one of the most remarkable of recent publications. He sought to make clear the structure of the German language and, by way of a new approach, to come closer to the basic linguistic units of its inner form than traditional grammar has been able to do.

As for foreign language instruction, mention must be made of the modern language method evolved by Bohlen (8), Fromaigeat's penetrating technic (32) of "practice-substitution," and the interesting classical language method described by Rotter (95).

In the field of music education, the comprehensive work by Kraus and Oberborbeck (65) offered a remarkable introduction to the cultivation of individual and choral singing and to the study of music in school. Besides the sharp-flat tonality, it takes into consideration tonal church melody and the new diatonic scale; besides function-bound melody, it considers free-moving melody. Kraus and Schoch (66) undertook to evolve a new method of musical instruction. Jöde (60, 61) wrote a valuable theory of elementary music instruction. Nitsche (84) published an introduction to the nature of voice functions and an excellent book of exercises for vocal training. Stoverock (118) published a singing method based on the pentatonic scale. Teuscher's comprehensive introduction to music (122) was also based on the pentatonic system. Pontvik (91) dealt with the usefulness of musical experience in psychotherapy; Fischer (28) published a noteworthy handbook of musical education.

Heymann (50) showed the distinction between children's drawings as a form of expression of psychic growth and of artistic expression, and showed the former's specific importance in the development of the child's powers. Of interest for the psychology of drawing was the investigation on the monozygotic disposition. By analyzing the drawings of monozygotic twins, Probst showed the esthetically negative effects of this disposition (50). Schnell devised exercises in drawing and painting useful in the anthroposophic Waldorf schools (50). Meyer (78) sought to awaken understanding for free creative activity on the part of children. Herrmann (44) and Netzband and Eschen (82) made contributions to the methodology of drawing instruction in public school. Trümper (127) published a manual of art education in school.

Roth (93) investigated the attitude of fourth-grade elementary-school pupils toward history. The pupils were asked to say what they would like to hear about the past of their homeland. A wealth of answers was received and subtly interpreted.

Mathematics and Science

Stückrath (121) investigated the development of space experience in early childhood and at school age. He made systematic use of the observation and description of experimental attempts by pupils. He succeeded in establishing interesting distinctions between the body-space and the ego-space of the small child, and the walking-space, activity-space, and comprehension of geometrical space of the child in school.

Hazmuka (41) advocated the "total" method for instruction in arithmetic. Weyrich (136) made use of activity methods of instruction. Walper (132) introduced instruction by experience into the teaching of arithmetic. Along the lines of the progressive efforts of Felix Klein, Breidenbach (11) urged that mathematical education be used to develop functional thinking. He drew up a unified program for instruction in public and more advanced schools. Gonseth (36) considered the didactic and educational foundations of mathematical instruction. He investigated the adaptation of mathematical instruction to the student's maturing process and the problem of the integration of mathematical thinking.

Zietz (142) investigated the ideas of children about physical work. He based his investigations on classroom conversations which he carried on for many years within the framework of the upper grades of a public school for boys in Hamburg. The answers were recorded after each of the conversations in order not to introduce a jarring note into the questioning procedure. This method yielded valuable results. The answers revealed typical modes of thinking about casual relations, about energy-substance concepts, and a tendency to reason by analogy. Ploetz (89) undertook similar investigations in connection with the child's interest in and understanding of living things, especially animals. This author's ideas about the evolution of nature experience and his psychological justification of biology instruction are valuable.

Stieger, Müller, and Müller (117) laid out a course of instruction in natural science designed for group teaching and block teaching. The same school of thought gave rise to a method of natural science and geography instruction discussed by Roth and others (94).

Special Programs

Remedial and special education are receiving increasing attention. General studies were published by Busemann (15), Asperger (2), and Hanselmann (39). Heymann (51) expressed valuable ideas on remedial education. Zulliger (143), Berna (7), Stern (115), and Mayröcker (77) commented on educational difficulties. In the field of sensory deficiency, most attention was given to hardness of hearing and deafness, in particular by Baumann (3), Bosshard (10), and Führing and Lettmayer (33). Heymann (49) wrote a study on infantilism. Gottschaldt (37), Brunner (13), Tumlirz (128), and Schneider (103, 104) discussed educational blocks and negligence. Scherpner and Trost (101) published a handbook on remedial and special educational institutions; Egg-Benes (22) also reported on the remedial schools.

Teacher Personnel

Schohaus (107) undertook to determine motives for choosing the teaching profession. In the report on the International Congress of Salzburg in 1954, Schneider (103) portrayed the representative educator. Brezinka (12) showed the hard plight of the educator today. Wollasch (139) discussed a typology for educators. As a criterion, he used the tension curve between teacher, child, and subject. According to the place in this tension complex, the individual types became apparent. Montalta (79) asked for greater thoroness in basic professional training, including didactics and methodology; for more emphasis on the social-educational viewpoint; for more specialized professional training; and for the postponement of candidate selection to a higher age level.

Discussion about teacher education brought forth a general demand for an extension of the training period. In the German Federal Republic, interest increased in the academic training of teachers. Weniger (134) advocated a six-semester school of education. In contrast to academic training, he rightly emphasized that teachers need a thoro development along creative lines. Löffler (75), demanded that teacher training be made into a discipline, handled along professional lines, but nonetheless in prevailing accord with standards in higher education. Helmich (43) recommended the adoption of an optional scientific subject to be studied not at the university but in the special school of education. Kroh (68) criticized the unsatisfactory relation between education in specific subjects and professional science training. Instead of the "half-solution" of the educational academies, he demanded a full course of studies at the university, with strong emphasis on social theory of education.

Orientation in Educational Theory

The need for orientation in the field of contemporary educational ideas and organization in German-speaking countries was met by an encyclopedia of education (64). Instructive reviews of the German-language educational press are provided by references to the monographs published in the various regions.

A number of institutes and information centers, some newly created, were extremely valuable for the stimulation of research in education and for the orientation of foreign investigators.

Summary

The efforts of educational investigators and educators in the German Federal Republic to solve the problems of teacher training and adult education deserve attention. Above all, the experience gained from the application of the *studium generale*, the high-school reform, work in the educational academies, and the improvement of public high schools are of interest.

In Austria, the broadly planned and state-directed experimental school programs, and particularly the effort to create new types of country schools, are sure to arouse the interest of the educational world. Stimulating, too, is the research in the fields of educational methodology and comparative theory of education.

In the German-speaking section of Switzerland, noteworthy efforts are being made to improve the upper grades of the public schools and to correlate and complete individual grades. Particularly momentous is the teacher-seminar reform which, in view of the cantonal differences in Swiss school life, might well yield a number of profitable lessons.

The educational efforts of the German-speaking countries show the general and urgent demand today for a deeper understanding of the educational duty of the school. This demand arises from the cultural distress of our time. Both harmonious development of personality and preparation for life in the community require a comprehensive educational and cultural policy.

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A good deal of attention was given to status studies. Each prefectural research institute investigated the condition of curriculum organization in its prefecture in order to provide a basis for reforming the curriculum. Some prefectures have already provided a new direction for curriculum development to meet current conditions. Many of these studies were carried on from the viewpoint of the National Educational Research Institute.

Special educational activities (extracurriculum activities) opened a new field of educational research in the postwar period; emphasis was put on this field of research to study the current situation and to suggest needed improvement.

In the area of teaching materials, studies of textbooks and audio-visual aids to learning were prominent. Recently the development and use of audio-visual aids has flourished and there is a growing body of research on their effectiveness.

There has apparently been no organized or comprehensive study of guidance; however, some valuable research was being carried on in separate subject fields. Most of the studies of school libraries reveal lack of books and facilities due to financial difficulties.

Educational Measurement

Research in the field of measurement can be classified roughly into three categories: intelligence, scholastic achievement, and personality.

Most research on intelligence was carried on by the educational research institutes in the 46 prefectures and five major municipalities, and dealt with the intellectual abilities of pupils in relation to their scholastic achievement. In Japan, the *Tanaka-Binet Type Test* is widely used; the standardization of the test is still being studied. The effect of children's living conditions on test performance in the various communities is noticeable.

The National Educational Research Institute carried out achievement testing on pupils of elementary and junior high schools in all Japan. Four areas of knowledge were tested: Japanese language, mathematics, social studies, and natural science; the tests were given in 1952, 1953, and 1954. Following this example, each prefectural educational research institute also administered the same types of tests, and numerous reports were issued on the results.

Besides these comprehensive studies, some research dealt with children's scholastic achievement in each curriculum, i.e., in Japanese language, mathematics, social studies, natural science, and English. An abundance of research focused especially on achievement in the Japanese language; the reason is that Japanese is in the basic curriculum and that to learn *Kanji* (Chinese characters) is a problem in Japan. Research on ability to read and write *Kanji* was most extensive.

There were a few basic studies of methods of selecting students to enter higher schools, concerned chiefly with the reliability and validity of aptitude and other tests as a means of predicting success in higher schools.

There were only a few research studies on personality. They dealt mainly with tests of emotions and methods of personality diagnosis.

Educational Psychology

Research in this field can be divided into three categories: experimental psychological studies on general learning behavior, studies of psychology in curriculum learning, and studies of problem children. In general, the present tendency is to emphasize practical problems.

In the first category, general learning behavior, the conditions of learning and transfer of training were studied. In the second category studies concerned with the learning of English and mathematics were carried on. As for the third category, the problems of so-called backward children and children's inferiority complexes were taken up mainly as research subjects.

Educational Sociology

Studies in this field can be divided into three categories. In the first were efforts to make clear the relation between various social conditions in the environment and the content and method of school education. The second may be called school or classroom sociology. Analysis of the framework of society in the classroom contributed to the study of educational method. Third, investigations of delinquency resulting from the displacements peculiar to presentday society brought to light educational problems from a sociopathological point of view.

A number of sociopathological studies were conducted to investigate the relation between the content and method of education and actual community life. However, it seems that there are still very few studies which indicate precisely how to make the results of a survey of actual conditions contribute to the reform of the method and content of education.

In the area of classroom sociology, problems of seating in the classroom, of reward and punishment, of guidance, and of the structure of the class have been the subjects for research. In studies on group dynamics, such problems as the social relations represented in group thinking and learning, the motive for forming a group, and the development of discussion groups, have all been examined. Attention was also given to sociometry. At the elementary level some work was done on achievement in school as related to conditions in the home.

After the war, due to the economic and moral confusion, youth's crimes increased remarkably, and the problem of juvenile delinquency became a subject of concern. A good deal of research was reported on social causes, i.e., the relation of home environment to social trends and delinquency. Problems of sex misbehavior and dope addiction were also widely studied.

However, these studies were limited to the diagnosis of the actual conditions and causes of delinquency; the methods and effectiveness of guidance deserve additional attention.

Guidance and Counseling

Research in this area was carried on in the following three fields: (a) educational and vocational guidance, (b) survey of students' living conditions, and (c) guidance of pupils in their personal life.

Overpopulation and job scarcity made the appropriate educational program a matter of great social concern for parents and students. Considerable effort was, therefore, devoted to research in this area. For the most part, investigations were carried on by the educational research institutes of each prefecture. Social trends were examined, and efforts were made to set up a guidance policy. Follow-up studies of students revealed what happened to them after graduation; of unique interest were surveys of their duties and responsibilities in the positions they obtained. Also of interest was a survey of occupations suitable for women. Student interests, hopes, and attitudes as they seek employment have also been investigated.

The recent war brought financial difficulties to Japanese students and pupils, especially to university students. Surveys made by universities revealed a great postwar increase in the number of students who worked for their school expenses. It was clear that a large number of the students who swarmed to the universities of large cities, such as Tokyo and Osaka. had financial difficulties. Evidence reported showed that while students could frequently find part-time employment in large cities, students in smaller cities had an advantage in this respect. Some students encountered financial difficulties so serious that their health and scholarship were affected.

Study on the actual conditions of pupils' lives was made from the point of view of the interrelation between environment, consciousness, and behavior. Findings were helpful in setting up basic principles for child guidance.

After the war the ethics course in schools was abolished. The result was that education concerning morals became very weak. Naturally there was much social confusion. Recently people have begun to show great concern about this problem; the importance of guidance both in and out of school has been emphasized. Research workers have devoted a good deal of attention to this area.

The training of children can be viewed as having two aspects: the training at home and that in the school. Training at home—particularly parental attitudes and opinions—was studied frequently. Attention was given to the effect of social environment on the child. School training was examined to determine the effects of reward and punishment on children of different ages.

Studies were conducted in classroom management, especially in relation to the effects and advisability of children's self-government at various grade levels.

Mental and Physical Development

There was evidence of increasing interest in this field by educators and psychologists, and more research was done in this area than in any other.

Studies of the development of infants and children were concerned with their mental, social, and physical development. Study of mental development was more extensive and included perception, concepts of number, speech, reasoning, causality, moral consciousness, and social behavior. Studies of adolescence treated various aspects of development such as interest in sex, moral consciousness, worries, attitudes toward war, and concerns about occupation. These studies reflected a growing interest in the problems of guidance and paved the way for programs to prepare counselors.

Curriculum Subjects

Research on the problems of Japanese language and mathematics has been frequent because these two subjects are included in basic curriculums. A few studies dealt with pupils' mistakes in learning the Japanese language; they were especially useful in the guidance of learning. There were several studies on the problems of Romanizing the Japanese language. There was extensive research on the teaching of arithmetic and mathematics; much attention was given to types and frequency of errors and methods of diagnosis at elementary- and junior high-school levels. Research on readiness in the understanding of algebraic concepts proved useful in the guidance of learning.

Social studies is a new subject in Japan, hence research and studies concerning it are understandably few. A good deal of attention was given to guidance in science. The whole problem of experiment and observation in learning was studied. Other research compared experimental teaching methods with lecture methods.

Vocational education is regarded as an important problem in present Japanese education, and in this field a large number of investigations were made in junior and senior high schools. About half of them attempted to relate programs of industrial education to the characteristics of the vocational situation of each district in cities and villages. Notable among them was a study of industrial education in a senior high school in relation to the complete land development program of Hokkaido. A public opinion survey made for industrial education is also noteworthy.

Research was carried on in the teaching of fine arts for the purpose of developing basic principles of methodology. The focus was on pupils' development of color sense and on their expression of shape.

Research Methods

Studies of research methods can be classified broadly into three categories. In the first, education is examined from a social viewpoint. Attention is given to surveys, interviewing, and sampling technics. The second category includes studies of research methods for investigating the development of children; these include behavior diagnosis, research methods dealing with the child's home environment, and direct studies of factors in child development. Examples of recent work in each area are cited in the bibliography.

The first and second categories are mainly studies of individual research technics. The third is somewhat different. It is a study of methodology covering the whole field of educational research. The number of such studies is small, but there is at least one work in this field of study, "Educational Methods" by Seiya Munakata, in which an attempt to establish a scientific methodology of education can be seen.

Special Programs

In this field of study are included educational problems peculiar to remote places; the education of mentally handicapped, physically weak, blind, or deaf children; and also the education of working youths and of adults.

For the past 10 years, Japan has been in the process of instituting compulsory education thru the junior high-school level in remote communities in which people are at a great disadvantage in their natural and social environment. Effectiveness of education in these communities was the subject of several investigations. Attempts were made to discover problems thru comprehensive surveys which covered special needs of teachers and pupils, limitations of the environment, needed curriculum adjustments, school building construction, and equipment and facilities. Altho the results of the research have not yet pointed out any definite solutions, the financial difficulties underlying these problems were made clear.

Attention was given to mentally handicapped, physically weak, blind, and deaf children. Research in this field can be divided broadly into two parts. One comprises surveys and studies of the atypical child's character and intellect; and the other, studies of the organization and administration of special classes for him. In the former most of the research reported dealt with the development of social adjustment and occupational competence. Observational methods were generally used.

Surveys of the problems of postwar children of mixed blood were carried on tho the number of studies on this problem was rather small.

Research in the field of adult education can be divided roughly into two categories. Some research was devoted to studying the problems of adult intelligence and the reaction of adults to mass communication. In the second category was research on curriculums for adult education.

The education of juveniles and working youth began to be studied after the war, and interest in this problem increased in recent years. Efforts were made to discover the implications for educational organization of the conditions under which youths lived and worked. Attention was also given to determining the kinds of guidance, curriculums, and educational facilities which would be suitable for the education of these young adults.

Teacher Personnel

Comparatively little research was carried on in the area of teacher personnel. In the main, material cited in the bibliography can be classified into three areas. The first includes investigations into the problems of the teacher's suitability to his teaching position, studies of the teacher's life, and studies of his teaching activities in his job. The second group of studies concerns the teacher's intellectual qualities, his attitude toward new educational ideas, and his opinions on the essential points of learning. The third group takes up problems of teacher personality. A few surveys were conducted to determine what children and their parents thought of teachers. Some attention was given to studying the burden of school business, which is often thought by Japanese teachers to be too heavy. The economic situation of teachers, which was studied intensively some time ago, attracted but little attention during the period of this review.

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CHAPTER VI

Latin-American Countries: Brazil, Costa Rica, Ecuador, Panama, Puerto Rico

Section A: Brazil

ANISIO S. TEIXEIRA

Educational research appears to require a cultural and economic stage of development which is suitable to its inception and evolution. The evolutionary stage has not yet been reached in Brazil. Educators have not acquired a solidly rooted conviction of its necessity; the scarce financial resources available for educational purposes have been another main cause of the backwardness of research in the educational field. Consequently, an investigation, however superficial, of Brazilian achievements in this field will reveal a lack of theoretical foundation and basic general concepts.

However, in spite of the absence of such fundamental ideas, there is notable evidence of a scientific-experimental mind in educational research undertaken in Brazil, as is evidenced by the material cited.

Administration

The Municipality in Fortaleza, state of Ceará carried out a social-pedagogical investigation (83) intended to throw light on administrative problems in the educational field. Approximately 4200 students were interviewed by means of a card containing 60 items of information to be obtained from each student. The following aspects of the population were analyzed: distribution of students in accordance with grade in the school, curriculum, and age required for beginning studies; difficulties found in the subjects included in the curriculum; distribution of the students' parents according to their monthly income; and content of the students' breakfast according to the floor level of their dwellings.

As one of a series of monographs on the state educational systems in Brazil, the National Institute of Pedagogical Studies invited Joaquim Moreira de Souza to produce a report on the state of Ceará (88). His work was mainly a well-founded study of the specific geographical and social conditions of that state (which has been hampered in economic development by severe droughts). The study also described the historical development of education and its continuing problems, and of the many attempts to solve them adequately.

Moreira (61) conducted a survey of the educational system adopted by the state of Santa Catarina. The study revealed current conditions in the system, and also treated historical origins, socioeconomic motivations, and future prospects.

A report on the state of Parana by Piloto (71) followed the same general lines as that of Moreira. It emphasized, however, matters relating to the motivation of the population and of the school children, with the purpose of explaining as well as possible the many deficiencies in the learning process and the inadequacy of the schools of Parana.

Curriculum

Moreira, in his study of the curriculum of the primary schools of Brazil (63), presented a critical exposé of current thinking and historical and social conditions which have influenced the organization of the curriculum of the common primary school.

The study began with a discussion of some preliminary notions in regard to the concept of the school curriculum and the aims to be considered in education. It further dealt with the condition that determined the organization of the traditional elementary-school curriculum, with the curriculum itself and its local and foreign characteristics during the period of the Brazilian Empire, and with the primary school as it was conceived during the first years of the Republican period. It reviewed renovations tried after 1920 and the contemporary tentative reforms of the Brazilian school. It concluded with a general account of the bases and technics of curriculum improvement and their application in Brazil.

Educational Measurement: Intelligence Tests

Weil (103) prepared and validated the so-called *Nonverbal Intelligence Test,* which is now being used to establish the intelligence level of the Brazilian population. To measure the intelligence level of 300 adolescents, who were either working in commercial and industrial enterprises or were junior secondary-school students, Costa (34) employed Weil's test. Cordeiro (33) also used this test to compare the intelligence level of students from seven public schools of Pôrto Alegre with that of the students of SENAC (*Servico Nacional de Aprendizagem Comercial*—National Service of Commercial Training). Schechtmann (81) studied the validity of the test by applying it to 100 children from private schools in the Federal District. When selecting social and educational counselors, the Regional Department of SENAC in São Paulo applied Weil's, as well as Meili's tests to 89 individuals at high-school level.

Adapting and studying the *Del Olmo Ability Test* (94), Vieira established national norms applicable to adolescents who have to work and thus need occupational guidance.

Bessa (20) came to the conclusion that personality tests, while prepared for the purpose of studying psychological aspects other than intelligence level, can without losing their value for the specific field also reveal some aspects of the subjects' intelligence. However, correlations between personality and intelligence tests very seldom reach values equal to those found between actual intelligence tests. He concluded that word tests discriminate among individuals and that this discrimination is not on the basis of intelligence.

Analyzing intelligence tests, Carvalho (30) suggested that test norms are not stable but change thru time, especially when environment changes.

Weil and others (106) are undertaking studies of the intelligence level of salesmen, and their work appears to show the small validity of intelligence tests to forecast success in sales activities.

Ballard's intelligence test was standardized by Macedo (54) in an experiment carried out with 39,851 subjects in the Federal District. He made a comparative study of experiments carried out by national and foreign research workers.

Studying the *Goodenough* test, Barcellos (16) reached the following conclusions: (a) The "draw-a-man" test does not always reveal the child's mental level. (b) One application of the test is not enough to establish the intelligence of the subject. (c) An emotional traumatism may paralyze intelligence, and the drawing made during the shock period does not reveal the child's real intelligence level. (d) The drawing made for the *Goodenough* test may also reveal the emotional state of the child. (e) The parts the child emphasizes with heavy continuous and even lines (with the exception of those relative to the hair) reveal serious affective conflicts, usually originating in aggression. (f) The drawing's size increases in the case of normal emotional states and decreases in the depressive ones. (g) The firmness of the lines is correlated with fear and anguish states. (h) Once the conflicts are conquered, the children do not draw with very heavy lines.

Ginsberg (39) compared the results of a mental test applied to different ethnic and social groups.

Personality Tests

A wide variety of studies have been carried out on the *Rorschach* technic. Souza in a recent book (85) analyzed the test in all its aspects and offered his own contribution to the study of variations from standard reactions. As a result of his psychiatric and anthropological experience, he concluded with a chapter discussing the *Rorschach* diagram with tables and plates.

Taking as a basis a sample of 100 women and 200 men, Quintela (77) conducted a study largely concerned with problems of perception. With this purpose she studied global answers, details, rare details, clearly seen and badly seen forms, as well as time for and number of answers. After comparing her experience with that of Beck and Klopfer, the author reached the following conclusions: (a) The male group revealed greater tendency toward global answers and the female to details. (b) As to perception, the percentages found were very close to those encountered by other researchers. (c) In regard to details and small details the results largely coincided with those of Beck and Klopfer. (d) With respect to F+ and F−, the influence of cultural factors seemed to be quite significant.

Nick (65) showed the merits of the Rappaport formula in *Rorschach* testing and explained some of its more important aspects. Weil (99), using the *Rorschach* test in a professional guidance and selection test, reached the conclusion that the G type of perception is characteristic of individuals in high executive positions. Ginsberg (42) used the test among young people from Bahia. Guerra (44) studied it as applied to children. Vieira (95, 96) utilized the *Rorschach* in a battery, correlating it with the *Harrower* test.

Based on Allport's and Vernon's work on myopsychism, on Jacobson's expressive movements, and on Bull's and Eysebeck's work on motor-affective correlations, López conceived the *Myokinetic Psychodiagnostic Test*. The existing bibliography on this test is already quite extensive in Brazil, reaching some hundred items. For over 13 years, by means of every possible scientific procedure, the author has uninterruptedly checked the validity of his test (51, 52). He has used the data obtained thru the application of the test in the treatment of psychopaths (53).

Menezes (60) carried out several studies on this test and after 1950 tried it among the Kaingang Indians, as Vieira and Vieira (97) had done before among the Carajá Indians. Ribeiro (78) compared line diagrams of the *MKP* made with each hand separately with those made using both hands at the same time. Faria and Alvim (36), applying the *MKP* in the selection of candidates for nurse training and nursing aids, came to the conclusion that it should be used for diagnostic and prognostic purposes in nursing schools.

Arruda (32), as did the author of the *MKP*, studied the value of this expressive technic when applied to psychopaths.

Bessa (18, 19) and Bessa and Schwarzstein (21) conducted studies on the validity and utilization of the *MKP*. Carneiro and Amaral (27) examined the "nature-nurture" problem, applying the *MKP* to three pairs of identical twins. Avillez (12) gave attention to secondary deviations from the *MKP*. The use of the test in studying aggression was explored by Gammondi and Larez (38). Pereira compiled and examined various statistical indexes from results of the *MKP* applied to normal adults, Indians, murderers, the family constellation, immigrants (67, 69), and applicants to the Preparatory Flying Cadet School (70), finally evaluating intrapsychic coherence in his line diagrams (68). Pontual (73) studied the direction of movements in the *MKP* and in writing. Tuana and Riedel (91) examined the correlation between the Sheldon-Stevens somatotypes and the *MKP*. Andrade presented the first results of his research (5) on the application of the *MKP* to the blind.

Miscellaneous

The *TAT* is being studied and applied by the Brazilian psychotechnical services. The Institute of Occupational Guidance and Selection (ISOP) in the Federal District has carried out extensive research on the *TAT* (46, 47).

Based on a study of emotional reactions, Weil (98) elaborated a technic for studying emotional phenomena with the help of clearly defined pictures (as contrasted with the diffuse *Rorschach* ink blots). Among the advantages of this psychodiagnostic test is the fact that the testing and interpretation period does not exceed 20 minutes if the test is given by a thoroly experienced examiner.

A test for the classification of objects (64, 82) especially designed for the diagnosis of schizophrenia and cerebral lesion cases, was reported on by the ISOP. New scoring keys were made which simplified evaluation and made interpretation more objective. Test results were compared with indications obtained from the *MKP*, interviews, intelligence, interest, personality, *Rorschach* and *TAT* tests. The evidence suggests that the test is suitable for measuring certain aspects of personality and vocational interests. Guimarães (45), using the perception of colors, studied a new technic of diagnosing personality.

Braga (25) carried on research in the Federal District for the purpose of studying artistic aptitudes. She used the *Kwalwasser-Dykema* and *Seashore* musical tests. The results showed a very small correlation (.34) between the two tests. It was apparent, therefore, that the two tests do not measure the same thing. Since the group tested included only professional musicians, the tests were in a sense validated against the group; validity appeared to be higher for the *Kwalwasser-Dykema* than for the *Seashore* test. The author is proceeding with her studies with the purpose of presenting definite results in regard to musical aptitudes in Brazil. Braga (24) also attempted to adapt the *Meier* art test to Brazil.

Almeida (4) studied the *Differential Aptitude Test* meant to measure intelligence and aptitudes. He presented tables of intercorrelation for the various tests.

Ginsberg (40) in a comparative study of the interests of adolescents from different social levels reported on the use of an instrument to measure interest, the so-called "Book-Catalogue"; the instrument is also discussed in another publication (48). Thurstone's interest inventory was evaluated in São Paulo by Angelini (6).

Ginsberg (41) applied the following tests to a group of medical students, for validation purposes: *Wechsler Intelligence Test, All Questionary, Myokinetic Psychodiagnostic Test, Hans Zulliger Collective Z Personality Test, Conducted Biography* (following E. Mira y López' recommendations), Raven's *Progressive Matrices*, and Allport's *Study of Values*. She concluded that the tests selected seemed to be suitable for the environment being studied and that the various test results agreed in large part. Machado Filho (55) investigated the use of a Portuguese entrance examination in the Minas Gerais School of Medicine. However, further study on validity and predictive power is needed in order to furnish a battery of tests suitable for the vocational guidance of medical students.

Mandroni (56) compared the results of the *ABC* tests, conceived by Filho, with those of training in reading. She concluded that these tests were quite useful and had a satisfactory degree of validity. Souza (86) presented the conclusions reached in the clinical utilization of a new test of perception.

Educational Psychology

Research carried out in this field has dealt largely with the psychological characterization of the Brazilian child and adolescent, with special emphasis, therefore, on evolutionary and differential psychology. However, some work especially worthy of note dealt with the phenomenon of learning; some of the results are still unpublished. The work was carried on by Angelini (6, 7, 8, 9) in the field of serial verbal learning. Angelini observed a class of learning phenomena noticeable when one analyzes the serial aspect of learning, which some call intraserial phenomena. He compared the effects of two variables well defined in the serial situation; he also examined similarity of the various items learned and their possible effects on the learning process. He studied learning by first presenting original serial material to the student, and then presenting derivative lists or series in different degrees of derivation. The originality of his work is due principally to his study of the influence on the learning process of the variation of similarity among the listed serial material to be learned, as compared with the influence of different degrees of derivation.

Barcellos (15) and her collaborators conducted research among 124 children, inmates of a public institution in the state of Rio de Janeiro, to validate drawing as a psychodiagnostic test. To this end they used the statistical method and the biographical method, together with direct observation. Analyzing 15,840 spontaneous drawings, and 3000 drawings obtained thru tests and observation (the result of which was the preparation of 124 case studies), the researchers classified the personalities of the drawers, taking into consideration differences in intelligence and difference in trace and size of drawing, psychological differences as related to preferential motives (strange figures, lines, parts of the human body, sexual organs, scenes, geometry, cabalistic drawings, double animals, the sun, and their relation with night sleep); language problems, sense of humor, inventive spirit, and leadership ability.

The work of Souza (87) and Queiros (76) also showed that the drawings could be used for studying a child's personality.

Aguirre (3) studied certain aspects of emotional life (affection, anger, and fear) in adolescents from the high schools of the city of São Paulo. Analyzing the data collected for each sex separately, she emphasized the decisive influence which school experiences have on anger and fear. Adolescents generally fear failure and low marks, especially the males who react by trying to control the causes for such situations. Female adolescents fight fear, praying or seeking help. Anger is also caused by school failures. Boys generally react by hiding the feeling, while girls generally weep. Affection has as its principal object the parents, especially the mother.

Katzenstein (49) studied anxiety and aggression by administering tests to children of preschool age and by interviewing their mothers. Two hundred children, treated in the Orthophrenic and Psychologic Service in the Federal District were studied by Carneiro (28).

Ginsberg (42) compared the interests of adolescents from different social levels of the city of São Paulo. This study is part of another social psychology project (43) dealing with school children's attitudes toward colored children. Results showed a marked preference for white children on the part of all examinees, whether white or colored, and from whatever social level. Most white children, while showing a friendly attitude toward colored people, attributed to them a secondary position and frequently an inferior social role. Children from the middle class and workers' children who lived in mixed neighborhoods had a less favorable attitude toward Negroes than the children of workers living in almost exclusively white neighborhoods. Altho keeping the white ideal, colored children seldom attribute a secondary position to the Negroes. Bicudo (22) studying the same problems, reached conclusions similar to those obtained by Ginsberg. University students of São Paulo were used as subjects in an investigation conducted to discover what nationalities and national, racial, and regional groups were accepted by this population and to what degree. Martuscelli (58), using a scale of attitudes adapted from the Bogardus *Social Distance Scale*, concluded that there was no relation whatsoever between degree of prejudice and school background, or between prejudice and age.

Veloso studied various cases of school maladjustment (92) in a guidance clinic and made a social and psychological analysis of children in orphanages (93). Medeiros (59) investigated the causes of juvenile antisocial behavior. Among the factors he suggested as causes were: morbid heredity, mental illness, affective instability in infancy due to insufficient schooling, and the affective crisis of adolescence.

Collins (31) studied the application of multiple regression equations to the selection of engineering school students.

The work carried out by Fernandez (37) on the dreams of kindergarten and elementary public-school children leads one to believe that this may be a method which educators might use for finding out patterns and attitudes of the family toward the school child.

Marinho (57) examined the rise and evolution of language in the child, based on a study of data relative to over 100 children, some of whom were watched in their linguistic evolution almost day to day. The child's spontaneous remarks were recorded. In this way the growth of active vocabulary and the relationship of verbal language to the child's general activities, spontaneous drawings, or graphic language were noted. Thus, the various general aspects of the evolution of speech in children from one to six years were deduced, and a list of words was attributed to every age group, as follows: vocabulary of children from 24 to 35 months, added vocabulary from 36 to 47 months, added vocabulary from 48 to 59 months, added vocabulary from 60 to 71 months, added vocabulary from 72 to 83 months, and general active vocabulary from 72 to 83 months. The evolutionary phases of infantile language were listed thus: babbles and cries stimulated by social presence, words of dubious meaning, phrase words, incomplete simple sentences, incomplete complex sentences, and complete complex sentences (attained at six years of age).

The evolutionary appearance of grammatical functions, the presence of predominant subjects in the speech of the preschool age child, and other findings were revealed by this study.

Educational Sociology

Azevedo (13), starting from the premise that an analysis of the culture and the social milieu in which teaching is operating should precede any educational plan or program, studied the families of school children in Salvador, state of Bahia. The studies of Bicudo (22), Pinto (72), Ginsberg (42), and of the city of Fortaleza (83), also dealt with socioeducational problems.

Moreira in the state of Rio Grande do Sul (61) surveyed the educational situation with attention to socioeconomic status and conditions in the local culture. His monograph included a summary of the main cultural aspects of the state under consideration; a study of the administrative organization in the field of education; a study of the financing of education; the development and current situation of elementary teaching; the social, economic, cultural, and professional status of the teacher; a synopsis of teaching in the intermediate and upper grades; a statistical synopsis of the educational and cultural situation of the state; and finally, a general resumé containing conclusions and practical suggestions.

Using historical and normative survey methods, Abreu (2) conducted a lengthy study of the educational system of the state of Rio de Janeiro. The author presented the general organization of the teaching process, examined state and municipal educational administration, reviewed the general statistical situation in education, and dealt with educational finance. The report also treated problems of elementary teaching and the training of primary-school teachers. Each topic was accompanied by an objective, critical, and pertinent analysis.

Guidance and Counseling

Valuable work in this area was done by Weil (100, 101, 102, 104, 105), Barioni (17), and Costa (34). Weil (101), having reached conclusions similar to those of psychologists in other countries, continued his research in an effort to discover additional differences between persons engaged in office occupations and persons engaged in sales occupations, especially with respect to personality. He (105) found that intelligence tests were not useful for forecasting success in sales activities; such success seemed to be much more dependent on personality traits. His results provided psychologists with distributions of test scores for sales clerks. Weil further concluded that intelligence tests served better than other measures to differentiate between members of an administrative hierarchy.

The agencies in charge of industrial education are deeply concerned with the training and selection of counselors for occupational schools. To this end Tchaicowsky (89, 90) in 1950 undertook an experiment intended to establish an objectively adequate curriculum for the training of counselors. He also studied the validation of instruments and technics used in guidance activities.

Mental and Physical Development

Pourchet (74, 75) and Avila (11) studied the physical characteristics of several thousand school children in the Federal District, from the three main groups: white, mixed (*pardo*), and colored. The following anthropometric data were obtained: weight, stature, trunk-cephalic height, height of the acromion and of the externus furculum, biacromial and anteroposterior diameters of the thorax, thoracic perimeter, intercostal diameter, length of upper member, length of hand, length of lower member, and length of foot. The following indexes were also analyzed: health index (*indice cural*), ACH index (for nutritional conditions), and Livi and Kamp's weight index. The second phase of the research was devoted to cephalometry as well as to the study of constitutional types classified in accordance with the criterion proposed by Avila for the Kretschmer classification. The tables presented include both average values and standard deviations so that the data may be compared with similar studies made in other parts of the country or abroad.

Methods of Research

Barbastéfano (14) studied methods of sample selection in educational research. A list of selected psychological books was published by Siqueira (84).

Special Programs

Rudolfer (80) undertook a lengthy study of night classes for adult literacy training in São Paulo. She concluded that in these classes individual differences were probably far greater than in any other existing class: the students varied as to sex, age (from 12 to 64), civil status, profession or occupation, nationality, place of birth, and previous school training. Within this wide variation one factor remained more or less constant: the social class. All students came from the most underprivileged cultural and economic classes. Adults were asked their reasons for attending the literacy classes; responses showed that most came to satisfy immediate personal needs rather than because of social pressures or a desire for education in the abstract. Pacheco (66) examined the value of supplementary courses in the improvement of certain professions.

Cardoso (26) studied the status of professional guidance for children with speech deficiencies. Katzenstein (50) reported findings from a study of two cases of reading and writing difficulties. Aveline (10) examined the teaching of arithmetic (number facts) in primary schools.

Abreu (1) examined the character and aims of secondary education in Brazil, proceeding to a study of its organization and administration, the curriculums and programs, methods and technics employed, and the training and position of teachers, and concluded with an evaluation of the Inter-American Seminar on Secondary Education. His work was objective and critical in nature and was a faithful description of secondary educational problems in Brazil.

Under the guidance of Carvalho, (29), a secondary school was founded at the University of Brazil to serve as a pilot school for all others to be established eventually under the same conditions in the country. Carvalho encountered a major difficulty in organizing the secondary curriculum since according to law, school subjects must be organized in a certain way. She sought the best way of lending the greatest possible liveliness, interest, and efficiency to the teaching process without breaking the law. For this purpose she availed herself of a modernization of Herbart's didactics applied by Morrison in the United States, grouping the different parts of the curriculum in didactic units that were to be developed in accordance with the new pattern proposed by Morrison.

Teacher Personnel

Ribeiro, Camargo, and Brejon, teachers of school administration and comparative education in the School of Philosophy, Science and Letters of São Paulo (79) investigated the characteristics of teachers who took the examination required to qualify for a teaching career in secondary schools of São Paulo. Bonow (23) studied the curriculum for training primary-school teachers in the Federal District. Danneman, Pinto, and Carvalho (35) examined characteristics of professors of commercial courses.

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Section B: Costa Rica, Ecuador, and Panama

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Administration

AZOFEIFA (1), in a study of the problems of secondary education in Costa Rica, analyzed such aspects as orientation, courses of study, organization, methodology, and administration; he proposed reorientation and reorganization more in keeping with the needs and aspirations of Costa Rica. A commission of the Ministry of Education of Costa Rica conducted a study on secondary education (5) which dealt with the same subjects covered by Azofeifa (1).

Pittman (9) studied problems of organization and administration of primary and secondary schools, curriculum, orientation, supervision, and child accounting in Costa Rica. Gamboa (3) and Karsen (4) conducted studies of primary education in Costa Rica; they reported trends, methods, reorientation of programs, and analyzed the reports of foreign educational missions in that country as well as the technical assistance programs developed there. Karsen's study contained an exhaustive bibliography while Gamboa's study presented up-to-date information on child accounting, teacher training, physical plant, curriculum, supervision, and extension education.

A report of UNESCO's Technical Assistance Mission to Costa Rica (6) on research projects they had developed included research on rural education, primary education, vocational education, and teacher training. Cruz Gonzáles (2) of UNESCO's Technical Assistance Program for Costa Rica reported research on teacher training, promotions, school mortality, school attendance, reading, school libraries, and testing in rural schools.

St. Malo (10) reported research relative to the school population of the University of Panama and its relation to the fiscal problems of the institution. The report included analysis of the economic situation of students enrolled at the University of Panama (which is an evening institution), and the cost of failures, school mortality, excess teaching personnel, daily classes, and university education, among other problems. Miró (8) determined the economic resources of university students in Panama.

Educational Measurement

The Division of Statistics and Educational Research of the Ministry of Education of Ecuador administered a series of 10 achievement tests to the students of fifth and sixth years of the normal schools (7). The aim was to determine if the students had the general knowledge necessary to become efficient teachers. The fields covered were reading; composition; grammar; spelling; fundamental operations and problems in arithmetic; geometry; geography; history and civics; and the natural, physical, and chemical sciences.

The results showed that many of the facts learned in the primary school had been forgotten. In arithmetical reasoning and grammar the deficiencies were serious. The results showed equally serious deficiencies in the methodology of teaching and in the curriculum.

Language Arts

Salgado de Carbo (11) conducted a study in five primary schools of Quito, Ecuador, in which 2800 children of ages three to 14 participated. The study dealt with free color drawing and free written composition.

The study analyzed the first steps in the creative work of children, individual differences, and ways in which creative power develops. From ages three to seven the drawings refer to people and things which surround them. Both in drawings and written composition the child of age seven shows egocentrism, syncretism, and animism. In the second phase—beyond age seven—the child begins to evaluate his drawings. He aims at exactness; that is why he writes and draws little. There are no appreciable differences between the drawings made by children of either sex. In the third phase, ages 11 to 12, there is a marked transformation. There is harmony in the drawings as well as beauty in what the child writes. There are marked differences between the sexes. Boys are attracted by national and international problems; they are interested in democracy and are concerned with problems of injustice. Girls prefer sentimental themes; their compositions are frequently dedicated to their mothers. Some suggestions are included in the study to help teachers develop the creative power of children.

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Section C: Puerto Rico

ISMAEL RODRIGUEZ BOU

EDUCATIONAL research in Puerto Rico from 1950 to 1956 has been served mainly by two agencies: the Office of Research of the Superior Council on Education and the Division of Educational Research and Statistics of the Department of Education.

The Superior Council on Education, which is the governing board of the University of Puerto Rico, was empowered by law, when it was created in 1942, to conduct research on the most pressing educational problems of Puerto Rico and to place the findings of such research at the disposal of the educational system of the Island. Research has been conducted in four major areas: illiteracy, adult education, the language arts in the elementary school, and academic achievement in the university.

The Division of Educational Research and Statistics of the Department of Education was organized in the school year 1949-50 to supersede the former Division of Statistics. After this reorganization was effected, the division was given the responsibilities of developing the research and statistical programs of the department of education, which specifically included the following activities: conducting research studies on educational problems; constructing, standardizing, and applying tests for school use; preparing personality studies; conducting psychological research in reading; participating in the planning, execution, and evaluation of technical aspects of teaching; and collecting, disseminating, and interpreting statistics about the school system of Puerto Rico.

Administration

Three research projects conducted by the Superior Council on Education were carried on for the administration at the University of Puerto Rico. The first two were conducted prior to 1950 and dealt with the high-school academic index as a criterion of admission to the university and with academic achievement at the university level, respectively. The third project (1) was conducted at the request of the Committee on Human Resources appointed by the Governor of Puerto Rico to plan an economic program for the Island up to 1970. In its educational aspect, the study included such items as plant facilities, distribution of teachers, work programs of the faculty, student load, student guidance prior to entering the university, and the coordination of the university with the public high schools of the Island.

At the other extreme, the Division of Educational Research and Statistics of the Department of Education conducted a study of failures in the first grade (12). As a result promotion policies in the school system were re-examined, and there has since been a marked reduction in overageness of pupils in the elementary schools, especially in Grades I and II.

The Office of the Registrar of the University of Puerto Rico (24) developed entrance examinations for incoming students for the years 1950, 1952, 1954, and 1955. Scores are indicated as percentiles for applicants graduating from high schools—more than 5000 applications in each case. This same office established relations between the scores earned by the students in their entrance examinations and their high-school index and the grades obtained by them in their freshman year at the University of Puerto Rico (25). The Superior Council on Education, too, had previously conducted a study along the same lines.

Educational Measurement

One of the first tasks undertaken by the Division of Educational Research and Statistics of the Department of Education was that of preparing the necessary testing instruments in Spanish adapted to the Puerto Rican environment. Even as late as 1950, virtually all the instruments of educational measurement used in Puerto Rico were mere translations of others originally prepared for English-speaking children. No attempt had been made to conduct the necessary studies to adapt them for use in Puerto Rico.

The Division of Research and Statistics decided, therefore, first to translate into Spanish and adapt existing effective instruments originally prepared in English and, secondly, to prepare original tests for use in Puerto Rico.

One of the major areas of activity was that of intelligence. The initial work was undertaken in the field of individual testing, for which it was decided to use the *Wechsler Intelligence Scale for Children* and the *Revised Stanford-Binet* Form L.

A series of studies was conducted with a view to translating and adapting these two scales, which culminated in the publication of manuals (26, 23) for the *Wechsler Scale* in 1951-52 and for the *Stanford-Binet* in 1952-53. These manuals contain, in addition to instructions for administering the tests, the criteria for scoring and a brief report on the studies on which the adaptations were based. Moreover, the manuals present special norms for Puerto Rico for these tests.

Altho the initial research was in the field of individual intelligence tests, it was recognized from the outset that the major efforts of the Division would necessarily have to be in the field of group tests because of the large enrolment in the schools of Puerto Rico. One major series of tests, the *Cooperative Inter-American Tests* (comprising tests in general ability, reading, natural sciences, social studies, and language usage), was already available. This series had been prepared under the direction of Herschel T. Manuel of the University of Texas with the cooperation of staff members of the Department of Education of Puerto Rico, the University of Puerto Rico, and the University of Texas. It represented a pioneer attempt to produce parallel tests in Spanish and English. The complete series was published by the Cooperative Test Bureau of the Educational Testing Service in 1950. Special norms for Puerto Rico were prepared for these tests.

Another instrument which the Division of Educational Research and Statistics tried out was the *Goodenough (Draw-a-Man) Intelligence Test.* It was found suitable for use in the primary grades, especially with children between the ages of five and 10. Hence, a Spanish manual was prepared which contained instructions for administering and scoring the test as well as the norms for Puerto Rico (15). A special drawing sheet was also prepared for this test.

A brief explanation of some of the problems encountered in adapting the *Goodenough Test*, as well as the *Wechsler* and *Stanford-Binet* is given in a paper presented by Roca (21). Roca also summarized his work in the measuring of intelligence of Puerto Rican children with these scales. The results indicate that in general the Puerto Rican child will score lower on them than does the American child. With the *WISC*, the average IQ for Puerto Rican children was found to be 87.94, and with the *Revised Stanford-Binet*, Form L, it was 95.65. In the case of the *Goodenough Test* the norms for the different ages were also found to be lower, with the exception of ages five and six, where the children had been selected from private schools. There is no doubt that no matter how well an intelligence scale is adapted from one culture to another, there are cultural differences which will make the children from the second culture score lower than those from the first.

The Division of Educational Research and Statistics also translated into Spanish and adapted the manuals of the *Minnesota Spatial Relations Test* (18), and the *Minnesota Rate of Manipulation Test* (17).

A general ability test for use in the primary grades of Puerto Rico is now under development. Two forms of the experimental edition were printed during the first semester of the school year 1955-56 (13).

At the request of the U. S. Army, the Division of Educational Research and Statistics undertook the preparation of tests for the classification of recruits in Puerto Rico. The Army had been utilizing a Spanish translation of a test prepared originally in English for use with recruits in the United States. There was dissatisfaction with the Spanish version of this test; it was thought desirable to obtain a test which would be more effective in classifying Puerto Ricans. The division was commissioned to construct two forms of a test consisting of two parts: Spanish vocabulary and arithmetic reasoning. These two parts, together with the block counting part of the Army test, were printed as a confidential test which is being used by the Army at present.

Educational Psychology

An analysis of the basic readers used in the elementary schools of Puerto Rico conducted in 1948 revealed that many of them were not in keeping with our physical environment and with the idiosyncrasies, needs, and interests of the Puerto Rican child. The illustrations as a rule misrepresented our people, our ways and customs, our flora and fauna, our colors and light intensity. Most of the books were originally written for children of other countries and were translated into Spanish for use in our schools. The study (6) gave opportunity to the elementary-school children of Puerto Rico to express their preferences in regard to the colors and types of illustrations which they would like to see in their reading textbooks.

Guidance and Counseling

With the extension of educational opportunities to all pupils of school age, especially in the junior and senior high-school levels, and with an extensive industrial program going on, there is urgent need for instruments to help in the guidance, counseling, and placement of pupils. This accounts in part for the emphasis placed on the translation and adaptation of questionnaires, classification tests, and vocational inventories and on the construction of similar instruments especially fit to serve the children of Puerto Rico. Some work has been done along both lines by the Division of Educational Research and Statistics of the Department of Education.

The Sims Score Card for Socio-Economic Status was translated, adapted, and published under the Spanish title of *Cuestionario Sims sobre el estado socioeconómico* (8). The manual contains the results of the study and norms for Puerto Rico (9).

A test of general classification (14) was published for use in the junior high school and constitutes the first of a series of tests to be prepared in the field of industrial psychology. It is a modification of a test originally prepared by Bunker at the University of Puerto Rico. A manual of instructions accompanies the test.

The first test constructed by the division in its effort to provide measuring instruments especially designed for use in Puerto Rico was a vocational interest inventory for high-school students, Spanish and English versions, prepared by Roca (19) as part of his doctoral dissertation. The Spanish edition was later improved and a special IBM answer sheet adapted to machine scoring was prepared. The inventory was designed to yield scores corresponding to the following areas: fine arts, language, mechanics, science, numbers, clerical activities, and helping and controlling people. The manual of instructions contains norms by grade and sex (20).

The division also prepared and published a personality questionnaire for secondary-school students (11). Its purpose is to discover pupils with personal problems; it is used with an IBM answer sheet. A manual of instructions accompanies the test (10).

Language Arts

One of the most neglected areas in the educational field in Puerto Rico, according to the survey carried on by the Research Division of the Superior Council on Education, was the teaching of the vernacular (Spanish). Accordingly several studies on the subject were conducted. First among them was a word count in Spanish (7).

This research project, which extended over six years, was undertaken mainly to provide vocabulary lists for the writing of textbooks in reading for the elementary schools. The count utilized 7,066,637 running words from the following sources: oral speech and written compositions of school children and adults, religious material, radio scripts and programs, free and controlled association, newspapers and magazines, school texts, Buchanan's Spanish Word Count, and Rodriguez and Casanova's Word Count. Due importance was given to oral sources, heretofore ignored in most word counts in other languages.

The study appears in two volumes (three parts). The total number of lexical units is 20,542; the inflectional units, 62,888. The total of different words amounts to 83,430. Volume I contains the 10,000 most frequent lexical units arranged in alphabetical order, with frequencies and ranks; and the 20,000 most frequent inflectional units, in alphabetical order and also by ranks and frequencies. It contains, in addition, the lexical units with frequencies below 16. Volume II includes the weighted frequencies of each of the 10 sources studied. This Spanish Word Count was published jointly by UNESCO, the Organization of American States (OAS), and the Superior Council of Education of Puerto Rico.

Oral and written language in the elementary school was the subject of three studies conducted by the Superior Council on Education. The first dealt with the errors of written language committed by elementary-school pupils; the second dealt with their errors in syntax and morphology in oral Spanish. These two studies were based on the errors revealed in the students' compositions collected as one of the sources of vocabulary for the Spanish Word Count, and served as the basis for the third monograph on the teaching of the vernacular (2). This monograph expounds methods of teaching different phases of oral and written Spanish at the elementary-school level and suggests materials and activities which may be used to aid in correcting the language errors pointed out in the two previous works.

Another study, useful in securing words of equivalent difficulty in English and Spanish for translating from one language into the other, is the doctoral dissertation of Rodriguez Bou, Permanent Secretary of the Superior Council on Education and Director of Research for this organization (22). This work is useful, too, in teaching Spanish vocabulary to English-speaking students and English vocabulary to Spanish-speaking students.

Jiménez Hernández (16) has done historical research at the University of Puerto Rico in the methodology of teaching reading; his work extends from the early investigations conducted in Europe about the middle of the nineteenth century up to the studies and research carried on by William S. Gray.

Special Programs

Research on illiteracy and the problem of adult education was badly needed in Puerto Rico in order to have available the information needed when money was appropriated to deal with this problem, which by 1950 was still of very serious proportions. The federal Census of that year revealed approximately 25 percent illiterates among the population 10 years of age and over. Five research studies on the subject were conducted by the Superior Council on Education in the last decade. Three of them are previous to 1950.

By 1952 it was felt necessary to gather in one volume detailed information related to adult education. The literature on this topic is abundant in English, but very scarce in Spanish. Furthermore, there is an acute need for such material in other Spanish-speaking countries where illiteracy is a problem of serious proportions.

Accordingly a study was conducted to provide the necessary information (4). Part I of this study contains chapters on the philosophy and methodology of adult education; the psychology, interests, and needs of adults; the training of teachers for work in adult education; and the preparation of appropriate instructional materials for the teaching of adult illiterates. Part II contains a descriptive inventory of the agencies which participate in adult education activities in Puerto Rico as well as an appraisal of the work performed by each agency.

Five basic texts, *(Let's Go to School, The Workers, Citizens of a Democracy, Let's Take Care of Our Health,* and *Worthwhile Recreation),* to teach reading to adults were prepared in 1952. These five books—a primer and four readers—were prepared and tested for two years with groups of adult illiterates. They are based on five areas of interest and need; namely, education, work, citizenship, health, and recreation. They were written with controlled vocabulary and are used to teach reading in the primary level of the program of literacy work with adults.

A handbook (5) was prepared to describe and illustrate the method and the reading materials developed to teach adult illiterates how to read and write. It contains sample units and detailed procedures for teaching different phases of reading, writing, and arithmetic. The original mimeographed edition of 1953, used with the first two experimental groups, was revised in 1955 to incorporate the additions and modifications that were deemed advisable after the methodology was given an Island-wide tryout.

The Superior Council on Education conducted an analytical study of radio broadcasting in Puerto Rico (3). For approximately three years radio programs of local stations were analyzed from tape recordings and shorthand records; scripts were studied; and questionnaires and interviews used to gather pertinent information. The study went into several fundamental aspects of broadcasting; exposed its problems, attainments, and defects; and suggested means for their improvement. It covered the following aspects: (a) an introductory consideration of radio as a vehicle of information, communication, recreation, and expression, especially as contrasted with the movies and the press; (b) a brief history of radio broadcasting; (c) functions of broadcasting in the United States and in other countries of the world; (d) the physical aspects of broadcasting; (e) commercials and news commentaries; (f) musical, religious, and educational programs; (g) children's programs; and (h) suggestions for script writers.

Summary

Educational research, as may be seen from the studies conducted by the Superior Council on Education and the Department of Education as well as by individual initiative, is playing a part of increasing importance in Puerto Rico. Even tho the research projects are limited in scope and number, the findings are already helping to orient educational processes.

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CHAPTER VII

Scandinavian Countries: Denmark, Norway, and Sweden

Section A: Denmark and Norway

ÅGE HAUGLAND

THE close contacts existing between Denmark and Norway from both the geographical and cultural standpoints are reflected also in extensive traditional associations in the field of knowledge. In both countries, for example, there is a great deal of overlapping of educational with psychological research both as regards the content and the personnel employed.

Danish educational research, however, has had its own characteristic line of development, a broad account of which is essential if the position is to be fully understood.

Developments in Denmark

In Denmark, educational research in the strict sense of the term has been hampered by disinclination on the part of the University to recognize the scientific study of education as an independent subject separate from philosophy. Efforts directed toward setting up a chair of educational science did not until quite recently (1955) lead to any concrete result. K. Grue Sørensen, the professor nominated to this post, had until his appointment been engaged in school work on the practical side, while his literary output had been predominantly philosophical in character.

Earlier participants in the principal educational discussions had been chiefly teachers and philosophers altho there had always been a certain amount of contact with the University Psychological Laboratory (set up in 1886). Thus there was the Association for Experimental Pedagogy, which began its organized activities in this sphere in 1914, operating predominantly thru educators but assisted also by a professional advisory council. In its periodicals and yearbooks this association published reports on a number of inquiries altho the publications reached only a somewhat limited circle.

A more permanent and more official organization, the Committee for School Psychological Research was set up in 1923 with the support of both governmental and municipal authorities. The main task of this committee was to adapt psychological tests for use in Danish schools. It prepared Danish versions of the well-known *Binet-Simon* and *Dearborn* intelligence tests and produced general progress tests for use in connection with school subjects calling for a measure of skill or dexterity.

Even the comprehensive work of this organization, however, in which a great many Danish educators were engaged (several of them with psychological training), was confined principally to educational circles and only to a very limited extent was the work made accessible to a wider public by means of published reports.

Following the setting up of this committee, activities were further extended by the establishment of school psychology clinics in the various municipalities of Greater Copenhagen. The staff employed at these clinics, all of whom had originally been practical schoolmasters, continued their work by devoting their attention to a number of psychological and educational problems, but this work, too, was made available in published reports to only a limited extent.

In view of the fact that up to 1955 there had never been any separate chair of educational science, those educators concerned with educational research problems maintained contact with the University chiefly thru the University Psychological Laboratory where many of them had received their training. Several of the investigations undertaken were carried on under the direction of that Laboratory; e.g., an inquiry into the comprehensibility of texts in which all the substantives have initial capitals (as in German) as compared with other texts in which the substantives have small initial letters (as in English), an investigation conducted in connection with the Danish spelling reform of 1948.

As will be seen from what has been said so far, a peculiar characteristic of educational investigations in Denmark was that they were very much restricted to meeting the prevailing demands of practical everyday work, no great importance having been attached to systematizing the work or publishing the results.

A decisive development on the organizational side took place in 1955 when in addition to the establishment and manning of the chair of educational science previously mentioned, a Danish Pedagogical Research Institute was also set up.

Presentday Educational Research in Denmark

The central organization for Danish educational research is now the Danish Pedagogical Research Institute which, so far as administration is concerned, comes directly under the Ministry of Education. The Institute operates on fixed annual grants, and according to the program laid down it is to be divided into five departments: (a) a department for didactic investigations, (b) a department for basic educational and psychological research, (c) a department for tests and examinations, (d) a department for educational research activities, and (e) a statistical department.

Three of these departments commenced operations in 1956. The personnel and portfolio of the Committee for School Psychological Research previously referred to have been taken over by the Danish Pedagogical Research Institute. The director, Erik Thomson, is a former school psychologist, and the permanent staff of the Institute is recruited predominantly from school psychology clinics. In addition, there is a professional consultative council attached to the Institute, the University being represented on it.

At the present time (September 1956) the Institute is engaged on the following tasks:

An inquiry on a national scale to establish the value of educational tests as a basis for selection

Inquiries regarding the problems of maturity and preparatory instruction in the case of school beginners, with special reference to the development of reading ability

Revision of spelling lists to bring them into line with the new system of orthography

An examination of the extent to which and the reasons why children remain in a class for more than one school term

Investigation of the influence of typography on the reading ability of children weak in the subject

Investigation into the benefit of additional special instruction as compared with that of instruction in special classes

Standardization of general progress tests in silent reading as applied to village schools

Elaboration of methods of assessing a child's emotional adjustment to a group

Elaboration of forms to be used by teachers in recording their observations

Investigation of the extent to which intelligence tests and character-assessment tests as employed by the armed forces in the case of national servicemen can be used successfully with school children, and a determination of how a child's development and the system of instruction affect the results attained in such tests

Investigation of whether a reduction of lesson hours in a particular subject produces a reduction of effect

Preliminary investigation of some problems concerning young people

Investigation into the relationship between the speed of reading and the frequency of error.

K. Grue Sorensen, a member of the Research Institute's professional advisory council, and at the same time attached to the University of Copenhagen, published in 1956 the first volume of history of education (2).

The Danish Pedagogical Institute operates in constant and close contact with the University Psychological Laboratory, whose director, E. Tranekjaer Rasmussen, has been keenly interested in educational psychology, particularly the psychology of thought and the psychology of problem-solving (1).

Contact is also maintained with the school psychology clinics and with the *Emdrupborg* experimental school set up by the municipality of Copenhagen in 1948 and run by Anne Marie Norvig.

An important function in Danish education is taken care of by the State Pedagogical Study Collection in Copenhagen, founded originally as a school museum. It includes a comprehensive specialized library covering all branches of education, schoolwork, and methods of teaching, together with collections of instructional material and pupils' work. The Study Collection comes directly under the Ministry of Education.

The most important publications in connection with Danish educational research are the periodical *Nordisk Psykologi* (Scandinavian Psychology), a joint periodical for all Scandinavian countries issuing (in collaboration with *Acta Psychologica*) certain numbers in English. A *Leksikon for Opdragere* (Teachers Encyclopedia) was published in 1953, its principal editor being K. Grue Sørensen.

Staff for organized educational research work is recruited from among practical educators who have access to the course in educational psychology at the University of Copenhagen started in 1944 (the course is at present under revision). However, there are very few persons connected with educational research who have completed the full course for the degree of Master of Psychology with its extremely theoretical requirements.

In addition to the work done by the Committee for School Psychological Research and the tasks on which the Danish Pedagogical Institute is now engaged, mention may be made of the investigations into the question of school ability carried out by the school psychologist Henning Meyer and others, as well as the investigations into the same problem now being conducted by the school psychologist S. A. Tordrup. It may also be mentioned that in 1955 the Copenhagen Municipal Schools Council made an attempt to arrive at a statistical basis for awarding marks in connection with what is known as the *Mellemskoleprøve* (Middle School examination).

Investigations into the structure of the school class and the mutual relationship between pupils and teachers and of pupils one to another have been carried out by H. C. Rasmussen. With the object of investigating the problem of "colored literature" (comics and strip cartoons), psychological inquiries with recorded results have been conducted on the same basis as similar investigations in other countries; these investigations were conducted by Jesper Florander, the present head of department at the Danish Pedagogical Institute. The Ministry of Education has appointed a commission to deal with this problem, with representatives drawn from all walks of life.

Finally, in this connection, reference must be made to the comprehensive report on conditions among young people, issued in 1948-1952 by what is known as the Youth Commission, a body corresponding to the Swedish *Ungdomsvårdkommitté*. Special mention must also be made of a statistical report entitled *Den Danske Ungdom* (Danish Youth) published in 1951; an extremely wide-scale inquiry into youth and leisure *(Ungdommen og Fritiden)* published in 1952; and the report *Den Tilpasningsvanskelige Ungdom* (Maladjusted Youth), published in 1952.

Developments in Norway

In Norway, too, there are very close connections between educational research and psychological research, and in both these fields enormous strides have been made during the last few decades. Organized research as such dates from 1935 when the municipal schoolboards in Oslo set up the Committee for Educational Research. In 1936 the University of Oslo set up an Educational Research Institute and a chair of educational science in conjunction therewith. Some educational research has been carried out by the Teachers High School at Trondheim, altho the main purpose of this institution is to train teachers for elementary schools.

Finally, it may be mentioned that on the initiative of teachers organizations a special fund has been established under the name, Norwegian Fund for Educational Research (Norsk pedagogisk forskningsfond).

Educational (and psychological) research in Norway—to a greater extent than is the case in Denmark—has been in the hands of people who were in a position to devote themselves exclusively and systematically to the problem of research. The enhanced opportunities for systematic research work are presumably responsible for the fact that in the Norwegian language there are far more publications dealing with educational matters and addressed to the general public.

Presentday Educational Research in Norway

The Educational Research Institute at the University of Oslo is directed by Johs. Sandven, who in 1948 succeeded the highly respected Helga Eng. The Institute's fixed grants are very limited, and apart from the director it has no permanent staff attached to it. The necessary personnel is taken on as occasion arises and to the extent permitted by available funds. Since 1950 the Institute has had considerable support from the Norwegian General Scientific Research Council (Norges Almenvitenskapelige Forskningsråd), a body set up to administer surplus profits derived from football pools.

One of the most important tasks of the Educational Research Institute has been to work out standard Norwegian versions of the Stanford revision of the *Binet* tests. This work was completed in 1954.

In addition to this, the Institute has prepared three series of ability tests for children from six to 15 years of age. This work was based on data collected from about 10,000 children and completed in 1953. Subsequently there was a re-examination of the children who took part in the original tests, for the purpose of determining the prognostic value of such tests. These investigations are now being continued by an inquiry into general social behavior in the age groups subjected to these ability and prognosis tests.

The Educational Research Institute is also working on investigations into the difficulties experienced by elementary-school children in connection with fundamental arithmetical processes, with the object of arriving at a method of diagnosing difficulties in arithmetic. It is also conducting inquiries relating to first steps in reading.

Eva Nordland conducted an inquiry and published as a Treatise in 1955 "The Connection Between Social Behaviour and Upbringing, Including a Study of Parental Relationships as a Determining Factor." The subjects studied were children below school age. Systematic observations were made of the children's conduct in the kindergarten, and at the same time inquiries were made regarding the relationship of their parents by means of visits to the homes. It was shown that definite connections exist between characteristic features in the parents' methods of bringing up their children or in their attitude one to another, and features in the behavior of the children themselves.

The Educational Research Institute also published a report on a short investigation into the film-going habit among children and interest in films among young people 12 to 18 years of age.

At the present time the Institute is conducting investigations into the attitude of children toward various cultural factors: Subjects studied include newspaper reading and radio listening by children from 12 to 15 years of age, the reading of comics by children and the connection between such reading and the children's behavior and ideas, and children and the theater.

Reports on the activities of the Educational Research Institute are issued in Norwegian in the form of monographs or in the series of collected pamphlets entitled *Forskning og Danning* (Research and Education).

The Committee for Educational Research (set up by the school authorities for the Oslo municipalities) operates without any fixed budget, grants being allocated as occasion arises. Of the work done in recent years, mention may be made of Ribsskog's inquiry into the extent to which inherent ability is matched by proficiency in elementary-school work, and Haavardsholm's work on truancy in the elementary school. The last study seemed to show that truancy is attributable to a general feeling of frustration leading to regression, daydreaming, and escape.

Helga Eng has continued her studies of child art.

As regards more generally psychological investigations with an educational interest, mention may be made of an inquiry now in progress under the direction of Åse Gruda Skard at the University Psychological Institute in Oslo into the development of children in Norwegian working-class homes. The parents have been interviewed during the eighth or ninth month of pregnancy and the children observed and tested every fourth week during the first year of life. These investigations are still going on.

Jan Smedslund's experimental research into the psychology of the process of learning is also of educational interest. This work was carried out at the Institute for Social Research which receives very large contributions from private concerns for its national research programs. Skard's work on suitability for studying at universities and high schools and R. Rommetveit's treatise on social norms and roles are both of a general psychological nature but are interesting from the educational point of view.

In conclusion, it should also be mentioned that both in Norway and in Denmark work is being done on marking systems used in schools. A committee appointed by the Ministry of Education in 1954, after an analysis of the use of marking in schools as a means of assessing ability, put forward proposals for a radical revision of the marking systems so far employed.

Summary

Educational and psychological research in Denmark and Norway is still in its infancy. The methods employed in almost all the work discussed have been strictly empirical, and in the majority of cases they have been confined purely and simply to the collection of data. It can scarcely be claimed that any universal tendencies have been revealed by the research carried out.

Conditions have been responsible for the fact that the overlapping of educational research and psychological research in Denmark educational research work has been more closely associated with day-to-day work in schools. At present, representatives of Danish psychological and educational institutions are operating in a number of countries on the organization of important educational problems. On the other hand—and this is a fact not previously mentioned—there is in Denmark a lack of any active orientation toward other countries. There is a great discrepancy between the number of Danish educators able to study abroad and the number of Norwegians who do so. There is reason to believe, however, that in this respect important changes may be expected in the future.

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reversal tendencies, and on a group of normal children. The groups were matched according to sex, age, school, class, and the like. Differences between groups were marked. Prognostic value of the method was evaluated by means of a follow-up investigation and found to be very good. Out of 45 pupils reported to have marked reading difficulties, 31 showed a result in the reversal test that was below the tenth percentile. Edfeldt's investigation is of especial interest because earlier investigators reported negative results with reversal tests. The cause of the discrepancy seems to be that Edfeldt's test is based entirely on tasks of the matching type and on letter symbols or figures of a similar kind.

Edlund (6) studied the predictive value of a school maturity test in a follow-up investigation of 83 children. Prognostic power of the test was low. The most prognostic subtests were tests in Swedish and arithmetic. However, it is doubtful whether such general knowledge tests should be included in a maturity test since ambitious parents can force their children in the subjects covered. Edlund's intensive investigation showed that under such circumstances the tests lose their predictive value.

An attempt at predicting school success by noncognitive methods was made by Blomqvist (3). A comparison was made between secondary-school pupils who had remained an extra year in the first, second, or third grades, and a random sample of pupils who had passed these classes successfully. Rating scales were administered to the pupils, the mothers, and the teachers. The highest correlations with success in school were shown by "suitability for studies," "ability to concentrate," "will-power," and "desire for knowledge." Success in school was also significantly related to the parents' level of aspiration as to the pupils' further education and to a more positive parental attitude toward the school. In general it was shown that a more positive study environment was significantly related to success in school. Progress in studies correlated higher with the cultural standard of homes, marital happiness, atmosphere, and tidiness than with density of population and material status. A slight relation was evident between progress in studies and out-of-school interests.

The study atmosphere in the home thus seems to be essential to school success. Maltén (20) investigated to what extent good study habits improved elementary-school marks. By a partial correlation technic he held the attitude of the pupils toward the school, and their intelligence, constant. Correlation between study habits and success in school was zero. A variable that was not checked, but is probably highly relevant, is time devoted by the pupils to their homework. It might be advisable to use broader definitions of the concepts *study habit* and *attitude toward the school*. Both instruments were made exceedingly homogeneous by item analysis. In the same investigation, Maltén found that certain items of the study-habit instrument were significantly related to school success on different intelligence levels. He, therefore, advanced the hypothesis that certain study habits are more effective for children of low intelligence and others for children of high intelligence.

It is characteristic of factor-analytic investigations carried out in Sweden that the investigators have not kept variables independent of each other. Consequently, results of the analysis are dubious, a regrettable fact since such investigations have often been concerned with interesting problems such as Magne's studies (18) on the relation between memory-span tests, perception tests, learning tests, and intelligence tests; Trankell's studies (30) on the relation of left-handedness to certain personality traits; Elmgren's investigations (9) concerning the talent components made use of in certain school subjects; and Björsjö's analysis (2) of spatial, technical, and practical talent. These investigations do, however, contain many good suggestions and hypotheses.

Husén and Henrysson (12) used factor analysis to analyze relations between variables in different tests of knowledge. The object was to illustrate a new field of application for factor analysis; viz., to check to what extent the tests measure just those aspects which they are intended to measure. To attain this, a special variable, such as the school mark of the subject in question, was introduced in each analysis. For example, in an analysis in the subject of reading, the variables were five different reading tests and the pupils' reading grades. It was found that reading grades depended mainly on reading speed. Other results of the analysis are not so interesting since factors were very strongly correlated, due, among other things, to the heterogeneity of the population. The report does illustrate the possibilities of factor analysis.

Educational Psychology

Many aspects of the old and the new schools have been compared with the object of ascertaining whether or not the new and less restricted school can give the same quality of education as the old, if the new school generates better morale among the pupils while developing their sense of cooperation, if the new school is superior to the old in developing a sense of independence and judgment, and if the activity program makes pupils more interested in schoolwork.

Level of Academic Knowledge

A comparison (26) was made between pupils from the new school and corresponding classes in the old secondary school with groups matched regarding sex, age, intelligence, socioeconomic status, and neighborhood. The tests included Swedish, mathematics, English, and German. In every test the pupils of the old school system were superior.

Sjöstrand (24) held that the most important reason for this outcome was that the population of the new school was more heterogeneous than that of the secondary school where a rigorous selection of bright pupils was made. He suggested that the brightest pupils in the new school are being treated unfairly because the teachers pay too much attention to the dull pupils. Eklund (7) was of the same opinion. He compared intellectually homogeneous and intellectually heterogeneous classes as to their knowledge of English. When two groups equivalent in regard to sex and intelligence were compared, the pupils from the homogeneous classes were superior. Eklund suggested that the teacher's knowledge of the foreign language was of very small importance since the pupils studied English for only one year. Eklund thought that the most plausible explanation was that the more intellectually homogeneous the class, the more effective the teaching in this class. He tried to find support for Sjöstrand's hypothesis that teachers gave more time to dull pupils; his results were not conclusive.

Study Habits

Another goal of the new school is to give the pupils more useful knowledge, e.g., good study habits, while the goal of the old school is more restricted. Such habits are to be learned and strengthened by means of activity programs and special practices. The extent to which pupils of the different types of schools acquired these habits was examined (27). Pupils from the highest class of the secondary school were compared with pupils from the corresponding class of the new school (class IXg) regarding their ability to use a dictionary and to write a summary of an article. The former were more successful in the first test (significant at the 5-percent level) and equal to the pupils from the new school in the other test, seeming to indicate that the special training given pupils of the new school did not yield any marked results. There was, however, one possible source of error. The first test had a very high correlation with intelligence (.74-.80). It is highly desirable that the investigation be repeated with a test that does not put so much stress on intelligence, or that comparisons be made between groups of equal intelligence.

Morale and Cooperation

As to morale, only a few comparisons have been made between the schools. Sociometric studies (25, 28) indicated that the number of isolated pupils is less in the new school. The most plausible hypothesis is that fellowship is favorably influenced by group work existing only in the new school.

Unfortunately no studies have been made regarding influence of activity teaching on the development of ability to cooperate. One of the most urgent tasks for research workers is to discover if such an influence exists, and if so, how strong and durable it is.

Interest in Schoolwork

By using activity teaching and by putting a greater stress on practical subjects in the new school, it was thought that its pupils would be more interested in schoolwork despite the fact that in this type of school there is no differentiation as to intelligence. Investigations hardly confirm this hypothesis.

Follow-ups (24, 25) showed that interest in the study of English, when first presented, was very great in the new school. Instruction in English—a combination of radio and correspondence courses—proved as popular as practical subjects and even more popular than Swedish and mathematics. However, each year interest in schoolwork diminished, especially in English. This was most marked among the boys. Interest in English was least among the least gifted pupils, and it was also among these pupils that interest declined most rapidly.

Follow-ups (25) have been undertaken in the new school and in the old school. The groups studied were equivalent as to intelligence, sex, and neighborhood. After some years the same pupils indicated their interest in 20 different subjects and 25 avocations at school. No differences appeared between the two types of schools with respect to interest in the subjects. In the higher classes it was considered more interesting in the new school than in the old school to work in groups, give a report of something to the class, have class discussions, and to use workbooks. In the new school, pupils showed less interest in private work and like activities.

Thus, investigations seem to indicate that the new school does not promote pupils' interest more than the old. A possible source of error is still inherent in the teacher factor. Teachers in the new schools are generally less able in applying principles of activity teaching than teachers in traditional classrooms are in giving their formal instruction.

Educational Sociology

A goal of the new school is to produce socially well-adjusted personalities, with children learning cooperation and morale more effectively than under the old system. Extensive research has been carried on concerning social interrelations between children in schoolrooms. Only two of the most important are discussed here.

The Swedish pioneer in this field is Johannisson (13); however, Bjerstedt's doctorate (1) is more modern and profound. Bjerstedt found that sociometric status scores are often assumed to be: (a) relatively unaffected by preference method, (b) unaffected by choice aspect or criterion, (c) constant over a period of time, (d) accompanied by the individual's awareness of his own relative sociometric situation, (e) correlated with the degree of "adjustment" and "efficiency" of the individual, and (f) susceptible of similar interpretation in different countries. Except for the last, all these assumptions have been tested by Bjerstedt in his investigations.

The first assumption was tested by means of a correlation analysis including five different methods: paired comparison, rank order, two different rating scales, and the indication of simple choices. The latter was most easily understood by the subjects and was otherwise also more convenient. However, the three first-mentioned methods seemed more closely related to each other than to the other methods.

Testing of the second assumption showed that socio-preferential status seemed to be relatively undifferentiated at early ages. Among older children a greater differentiation appeared.

In general there was a fairly stable number of positive work-mate choices received even over periods longer than one year.

Awareness of choice reception and choice status varied, among other things, with the preference level and the status of individuals involved. Questionnaire data showed that overrejected subjects often perceived themselves as dissatisfied. Low-status children were described by the teachers as problem children and generally inferior with respect to general and physical achievement. They tended to have lower scores on intelligence tests, higher scores in cheating and lying tests, and a lower ability to admit errors. These results concerning adjustment at school are a corroboration of Johannisson's findings (13).

Guidance and Counseling

Another goal of the new school is to promote the development of the pupil's personality. Guidance and counseling are more important in the new school than they were in the old; and at the moment these fields are very popular with research workers.

The Problems of Left-Handed Children

Trankell (30) in his doctoral thesis tried to prove that right-handedness generally is inherited as a Mendelian dominant factor. This theory will not be discussed here. For diagnosing left-handedness, two methods were devised: the impulse scale with which the preferential hand usage of the individual was measured; and the asymmetry test for measuring the relative skill and dexterity of the two hands. Both tests are great improvements on earlier methods; reliabilities and validities are good.

Trankell showed that the left-hander's ability to learn to write with his right hand is directly related to the dexterity of his right hand as compared with his left; furthermore, the stronger the tendency to use the left hand as measured by the impulse scale, the more difficult it was for the child to overcome the obstacle of learning to write with his right hand. The social development of a child seemed to be related to his ability to learn right-handed writing. In general, the better adjusted child succeeded better and more often.

In another investigation Trankell (29) showed that "extremely" left-handed children had just as good a calligraphy as right-handed children. If left-handed children do not train both hands, their handwriting will be good.

Discipline

A preliminary report concerning a recent large-scale investigation of the discipline problem in schools was presented by Husén (11). The problem was the relation of the home environment of a pupil to his behavior in school. The most significant result of the investigation was that the parent-child contact, and especially the mother-child contact, was most important. Children with lesser contact with their mothers tended to have worse behavior ratings. It was also shown that children from homes with consistent and established behavior and habit patterns tended to have good school behavior ratings.

Some sex differences appeared. If the mother was less child-centered, boys tended to be problem children—more aggressive, disturbing, careless, and the like. The less child-centered mothers had more passive and inattentive girls.

A hypothesis that a discrepancy between educational theory and practice in the home is related to a child's adjustment at school did not hold because correlation between rearing ideology and actual practice was too low; therefore, the discrepancy between the two measures was meaningless.

Marklund (21) studied the same problem and corroborated the above results. He also found that the greater the differences between declared attitudes of the mother and of the father, the more disturbed the pupil seemed to the teacher; likewise the greater the differences between the teacher and the parents, the more disturbed the pupil seemed to the teacher.

Over- and Underachievement in School

As a measure of over- and underachievement Dureman (4) used the discrepancy between actual achievement and achievement predicted from an intelligence test. Among the 7 percent who most extremely overachieved, 74 percent were girls; and among the 7 percent who most extremely underachieved 64 percent were boys. No relation existed between over- or underachievement and the socioeconomic status of the children's parents. Behavior trends indicating resistance or opposition to the teacher and norm system of the school were definitely related to underachievement. No differences were found between groups with respect to symptoms characterizing anxiety and tension. Overachievers were characterized by power of concentration, interest, and endurance in schoolwork.

Mental and Physical Development

The idea that differentiation of pupils should occur in the last class of the new school (from which they might go on to work in theoretical, general, or trade subjects) was based on results of Elmgren's investigations (9). Correlation between theoretical and practical ability was positive but very low in a sample of 10-year-olds. The low correlation is explained by the fact that practical ability was defined by the *Minnesota Mechanical Assembly Test*, a complex measure of manual dexterity; theoretical ability was determined by a verbal intelligence test. Correlations showed an increase up to age 15. However, it was impossible to determine whether this increase was actual or corresponded to systematic errors in, for example, the sampling method (10).

Development curves for theoretical and practical ability showed some discrepancies. The latter indicated a growth spurt at the age of 15 which did not exist in the former curves. Elmgren believed the spurt to be conditioned by puberty changes; however, this was not proved because of the unsatisfactory choice of samples.

The concept of late differentiation is based on this growth spurt which is thought to destroy a prognosis at earlier ages; but, as Sjöstrand (24) pointed out, if such a spurt really occurs it is not certain that it destroys the prognosis. Only longitudinal investigations can answer such questions.

Sandels (23) worked with cross-sectional and longitudinal methods as applied to children in the age group one and one-half to eight and one-half. All children were put into situations which gave them the greatest possible freedom for undirected manipulation of material. By making "attractive" material available, activity was induced; then all reactions of the subjects were recorded. Behavior studied included: ordering of objects such as sorting of beads; partitioning and distribution, e.g., the cutting of a cake and distributing slices to dolls; and the collecting of objects, such as balls, in a basket.

The new methodology in the research seemed to make it more reliable than previous studies. The study was based on the hypothesis that development of concrete motor behavior illustrates the development of concepts and that such motor behaviors as sorting are prestages to the classifying functions of the mind.

There is an urgent need for further development studies, especially studies that use the longitudinal method.

Language Arts, Fine Arts, Natural Sciences, and Mathematics

Most investigations in this field were concerned with the teaching of mathematics.

Magne (14, 15) tried to discover whether solving fractions by placing the quotient over the dividend was more effective than the Swedish method of placing quotients under divisors. Results seem to show the former method to be superior to the latter. It was impossible to determine whether this was due to the superiority of the method or to teacher enthusiasm for the new method.

In another investigation (17) Magne examined the importance of personal activity in individualized instruction. Numerous experiments indicated that the pupils' work on their own thru personal activity was less effective than formal instruction; therefore, he recommended class instruction.

Many practical pedagogues have a notion that the teaching of difficult parts of the curriculum should be postponed until the pupils have reached a high degree of maturity. Magne (16) was of the opinion that before such ideas are put into practice, they should be tried out with special attention to instructional methods. Long division constitutes a difficult part of the elementary teaching; therefore, he had experimental groups begin *earlier* than normal with division. One group was instructed in the conventional way, i.e., they were taught the four rules of arithmetic in order: addition, subtraction, multiplication, and division. In the other group a "circular" method was used. When comparing, it was found that the special class did as well as the regular altho it had started earlier. The conventionally instructed group was clearly inferior to the special "circularly" instructed group.

Only methods of teaching elementary mathematics have been tested. It may be advisable first to reform basic instruction since pupil attitude toward a subject is probably established very early.

In teaching reading, a synthetic method is used in Sweden while an analytic method is generally used in America. Naeslund (22) determined which is more effective. Identical twins were used as subjects, one twin being taught thru the analytic medium and the other thru the synthetic. The experiment was started before diagnosis of the twins was carried out; when this was done, it was found that 10 pairs were enzygotic. The most striking result was that the synthetic method gave better results with less intelligent pupils. For the highly intelligent, results were approximately equal. Naeslund believed that the superiority of the synthetic method derives from the fact that Swedish spelling is largely phonetic.

The superiority of the method cannot be considered absolutely proved for the following reasons: In order to keep the teacher factor constant, only two teachers were used. The same teacher instructed one twin of a pair thru the synthetic medium and the other twin thru the analytic medium. Teachers thus used two methods. They had long experience in one system but only brief training in the analytic method. It seems natural that they should teach more easily when the synthetic method was used, especially when they trained the most difficult pupils, viz., the least talented ones. It would have been better had the test been preceded by a very long period of teacher training.

Teacher Personnel

Numerous attempts have been made to construct aptitude tests to be used in selecting students for teachers colleges; these researches have been compiled and compared by Malmquist (19). Since 1948 the selection of students has been carried out using the following tests: (a) an essay intended to indicate the applicant's personality; (b) three tests in public speaking (The applicant's aptitude as a teacher was rated during these situations by a committee of experts.); (c) free contact with a group of children; and (d) psychotechnical tests, situation tests, and tests concerning direction of interests. Every teachers college had a free choice of what tests should be used, so various approaches to the problem have been taken. Ratings were made in different ways and the directions to the applicants were not identical. As a consequence of this, a satisfactory evaluation of the tests' prognostic value could not be made. The greatest difficulty, however, was to obtain reliable criteria indicating teaching aptitude. Therefore, Malmquist asserted that in the first place, emphasis should be put on the problem of finding acceptable criteria. These must relate to the teacher's skill in his daily work. In the second place, attempts should be made to find out what personality traits are most essential in various instructional situations and in different classes.

To improve the selection, Malmquist suggested the following tests: (a) narrative public speaking, (b) descriptive public speaking, and (c) a 20-minute interview based on a written autobiography.

These tests were to be graded uniformly with final ranking based on them and pupils' grades multiplied by the factor three. Entrance requirements would be based on this ranking. Graduates were to be followed up, and after they taught four years, teaching ability was to be rated. Teachers colleges in Sweden were to be divided into groups; in each group different personality and interest tests were to be given; however, these tests would not be used as a basis of selection. Investigation along these lines has commenced.

This proposal is probably a step forward, but its value may be relatively small. Since the relative weight of the variables constituting the basis of selection will be different at different colleges, it will be very difficult, if not impossible, to study the prognostic power of the different tests.

Summary

Among the contributions of researchers outlined here, comparisons between the old and the new school are probably the most interesting to educators in other countries. Investigations indicate that certain goals of the new school cannot be realized. The level of knowledge, for instance, seems to decline. As yet, however, this question has not been fully elucidated.

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CHAPTER VIII

The United Kingdom

E. A. PEEL

EDUCATIONAL research in Great Britain during the period under review was largely in the fields of measurement, guidance, child development, educational psychology, group methods, and social influences upon educational processes. Attention was also paid to topics relating to teaching methods, teacher personnel, and programs for exceptional children. Less attention was given to research on administration, research methods, and curriculum altho in the case of the latter, quite a number of interesting and scholarly papers on historical aspects of the growth of curriculums and other more specialized historical and philosophical studies of education have appeared (20, 49) which could not properly be included in a review devoted to empirical research.

Since 1950, important research has been carried out on all aspects of selection for secondary education, and there has been a clearly defined rise in interest in social and group problems. Educational measurement and development continued to attract research workers. As for inquiries into teaching method, the subjects of English, French, and mathematics received most attention.

Administration

Material on the financial aspects of English education included the study by Peacock (129), the suggestions (10) derived from factual sources for revaluing local-authority schools, and the survey, without comments, of main building programs of local authorities in England and Wales (8, 9).

Two books on the English Educational System appeared, both of which were based largely on research material. Lowndes' book (102) was designed to give the reader insight into the basic reasons for trends in educational opinion and the essential background for this purpose. Armfelt's book (6) was addressed primarily to education students. The Ministry of Education report (112), *Early Leaving*, was devoted to a human problem of wastage in secondary schools, but many of its recommendations were made to administrators and heads of schools. Its findings were based on a competent statistical inquiry from a 10-percent sample of maintained and direct grant grammar schools in England.

Curriculum

Simms (166) found little grounds for satisfaction in the results of his inquiry of the school library facilities in 78 secondary modern schools.

Thirty-three schools possessed no central collection of such books, and 16 schools possessed fewer library books than pupils. The teaching of modern languages in secondary modern schools was comprehensively surveyed (15) by check sheet and questionnaire. Thirty-five schools where a modern language was taught and 128 schools where no modern language was taught were questioned. The inquiry concerned aims, choice, timetables, teachers, methods and content, effects, selection of pupils, and opinions.

Verse writing was recommended as a worthwhile addition to the curriculum by Widdows (199) and by Johnson (89, 90). The latter writer first surveyed books and opinions and then described her own experiments in lessons on verse making, comparing the writing of two groups of pupils under experimental conditions. Some form of nonimitative approach to verse writing was recommended in preference to direct imitation.

Educational Measurement

During the period under review, much attention was given to factors of practice and coaching in intelligence tests, to the applicability of established tests like the *Terman-Merrill* and *Raven's Matrices* under special conditions and to special populations and to the construction of new tests. On the side of attainment, several new tests of grammar-school subjects appeared, and research was devoted to the problem of using children's essays as a measure of their English at age 11-plus.

Peel (131, 132, 133) showed that the mere practice achieved when one intelligence test follows one month after another can give rise on the average to a gain of five IQ points and that gain was a function of level of ability. The practice effect between second and third tests was very small—on the average about one-half IQ point. Yates (210), James (88), Dempster (46), Wiseman (204), Vernon (187), Watts, Pidgeon, and Yates (195), and Wiseman and Wrigley (207) also considered this problem along with their inquiries into the effects of coaching on intelligence. Individual findings as to the effects of coaching varied, but most investigators agreed that a gain of some nine IQ points would be made. There was less agreement as to the best way of coping with the problem in secondary selection.

Foulds and Raven (63) applied the *Progressive Matrices Tests* to a sample of some 3800 individuals of very wide age range. Retest reliabilities were high for adults, low for the under-16's. Fraser Roberts and Mallone (65) tested a sample of mental defectives, showed that *Terman-Merrill* intelligence quotients are dependent upon chronological age, and suggested a method, which was later applied by Scarr (160), of adjusting the intelligence quotients to make them independent of chronological age. Dunsdon and Fraser Roberts (48) and Fraser Roberts and Dunsdon (64) showed that 70 percent of the total information from the *Terman-Merrill* test can be obtained by using the vocabulary section only. Walton (193) investigated the interchangeability of *Terman-Merrill* and *Matrices* test data by testing a sample of approved-school boys. Heim (76) showed that subjects tend to adapt themselves to the level of difficulty of test items.

In his monograph (186) Vernon presented a thoro account of educational and psychological test measures in terms of the theory of mental factors. Penrose (143) discussed genetic influences on the intellectual level of the population; Vernon (185) summarized studies of the mental qualities of the population; and later Burt (28) took up the allied problem of the concept of intelligence.

Research into new tests of ability included work by Bennett (12) on a group test of hearing; an examination by Jones, Hey, and Wall (91) of a group performance test; the work by Cornwell (37) on an orally presented group test of intelligence; and that by MacFarlane Smith (104) on the development of a group pencil-and-paper spatial test.

In the field of attainment tests Eppel (54) devised a new test of poetry appreciation which he claimed gave "satisfactory reliabilities." Wing (203) gave further results obtained from his tests of musical appreciation and attainment. Daniels (44) discussed ways of testing grammar-school geography at the ordinary level of the General Certificate of Education. His results seemed to vindicate the essay type of examination. Percival (144) devised reliable tests of French grammar and vocabulary for the years of the grammar school up to the General Certificate of Education ordinary level. R. A. C. Oliver (125) discussed the results of applying an experimental examination in general studies at the ordinary level of the General Certificate of Education. Studies of educational measures relevant to physical education include the papers by J. N. Oliver (121, 123) on the use of the Wetzel grid and by Duthie (50) on physical tests in the secondary school.

Several papers have been written on the reliability of the English essay examination for selecting pupils for secondary education. Finlayson (60) showed that a team of three markers marking two essays written by each pupil could produce an over-all reliability of .88. McMahon (106) and King (95) reported similar findings. Vernon and Milligan (188) investigated the reliability of essays written by students and showed that two markers of seven essays per student yielded "a reasonably reliable" measure. Penfold (141) compared the variance between examiners with that between pupils' essays and found the former to be significant and the latter not sufficiently high to render the marking free from statistical error.

Educational Psychology

Several investigators looked into psychological aspects of visual education. M. D. Vernon wrote three papers (179, 180, 181) on the visual presentation of factual data and on the value of pictorial illustration for the instruction of children. She showed that the production of a continuous and coherent argument is the main factor in understanding isolated statistical data and that given this, pictorial, graphical, and numerical presentations were equally effective. She could find no marked general superiority of illustrated over nonillustrated material. Ash and Carlton (7) investigated note-taking by students during the showing of educational films. Note-taking while watching an instructional film tended to interfere with learning its contents. Nias and Kay (118) showed that presenting a 30-minute dramatized version of legal material resulted in efficient knowledge and understanding of legal points. Belson (11) showed that altho a television series on French life increased the comprehension of viewers, it also tended to make them apprehensive about language difficulties and customs.

Jones (92) found the mean nonverbal IQ of a group of bilingual Welsh pupils to be significantly higher than their verbal IQ. The difference tended to diminish as reading age in English increased. Hillman (80) photographed the eye movements of children as they were reading and suggested that a correction of the eye movements of slow readers would increase their speed of reading. Kay (93) investigated the learning and retaining of verbal material and reported that in short-term learning studies more attention should be paid to the "initial interpretation" of the learner.

Humphrey (87) examined 70 left-handed and 35 right-handed adults, using an adapted questionnaire from Hull and found that left-handers were less consistent. He suggested a threefold index for classifying handedness. Burge (24) used strength, accuracy, and speed tests of handedness on a group of 312 school pupils including right-, left-, and mixed left-right-handers and related his results to eye dominance and age. The accuracy test seemed superior for diagnostic purposes.

The problem of discipline was considered in the large monograph (78) published by the National Foundation for Educational Research in England and Wales, the result of an extensive survey in schools thruout the country. Many aspects of the problem were dealt with, including the teacher's most acute and persistent difficulties, the characteristics of difficult pupils, and the importance of understanding the pupil's attitude toward school. The majority of teachers opposed the prohibition of all corporal punishment. Burt and Howard (30) factor-analyzed the conditions and qualities of 273 maladjusted children to investigate the nature of maladjustment. They obtained a bipolar grouping into environmental and personal conditions and a further division into intellectual and emotional factors. Birch (14) surveyed a large industrial area for the incidence of nail-biting.

Educational Sociology

Research in this field included several investigations into group structure and education, a number of inquiries on the effects of outside influences on school progress and general attainment, and various papers on educational aspects of social psychology.

Richardson and others (156) demonstrated the value of friendship groups for the teaching of English. Children in such groups revealed a better attitude even to the formal aspects of English grammar than a number of control children. In a further contribution Richardson (155) applied group technics to speech problems. Higginbotham carried out experiments in leaderless discussion by groups of sixth-formers and approved-school girls (156). Shukla made a study of school friendships by using a questionnaire embodying a simple sociometric test (156). Hallworth (72) demonstrated the existence of relatively stable groups within each form, each of which possessed its own value system which tended to be centered on "over-chosen" individuals. The Bristol Institute of Education published a collection of researches (96) on the formation of spontaneous youth groups; Davey (45) studied factors making for social harmony in the classroom; and Shaw (164) in a study of popular and unpopular children brought out the complexity of the forces that cause class group structure. Oppenheim (126) showed that popularity and friendship groupings among grammar-school boys are not so bound up with socioeconomic status as is the case in American schools. Smith, Sluckin, and Graham (167) made up groups of primary-school girls of various combinations of ability and assertiveness; set the groups on brick building projects; and assessed them for friendliness, cooperation, quality of work, and quantity of material used. Murray (114) showed that E. S. N. children formed friendships which were more stable than usually believed and discussed the implications of his findings for the organized group activity of the children.

Lowe (101) demonstrated a tentative predictable relationship between a child's social background and success in school, and Campbell (31) showed that home background exercises a clear-cut influence upon the progress of pupils in secondary schools. The Scottish inquiry (162) into the social implications of the 1947 Scottish Mental Survey showed how intelligence and attitude toward education varied with occupational class and social background. High IQ's tended to be more widely distributed across the whole range of occupational class, whereas low IQ's were more limited to the lower economic levels. McLaren showed that the initially better readers came from homes of higher socioeconomic status and that school experience between five and eight years does not reduce differences between children from different socioeconomic levels (163). By surveying the parent and home ratings of grammar-school pupils, Halsey and Gardner (73) found that a middle-class boy had a greater chance of entering a grammar school than the son of working-class parents. Glass (67) related social mobility to educational factors. Blyth (17) inquired into the relation between habitat and outlook of children in rural, small town, urban, and other areas. Restricted habitats tended to dominate the children's outlook. Patterson (128) showed that migrancy of pupils, largely owing to the casual nature of farm labor, is a more serious problem in the rural schools.

Forrester assessed the attitude of adolescents toward security, adventure, development, rights, and responsibilities in the physical, mental, social, and other spheres (156). Himmelweit, Halsey, and Oppenheim (81) found that adolescents revealed a real sense of social class and underestimated their fathers' occupations according to their own aspirations. Phillips (145) obtained opinions from secondary modern school girls of what made for happiness-unhappiness in the home and other aspects of family life. Shared pleasurable experience with parents was voted most desirable. Wilson (202) showed that the vocational preferences of secondary modern school children were made with regard for personal limitations, district needs, and opportunity. Pringle (148, 149) gave Doll's *Vineland Social Maturity Scale* to a sample of English children and pointed to the need for a British standardization. She discussed, also, the value of the concept of social backwardness and its reduction by training.

Guidance and Counseling

Research under this heading fell mainly into the groups of (a) the predictive power of age 11-plus selection technics, (b) the problem of borderline cases and misfits, and (c) the selection of undergraduate and student teachers (dealt with later under Teacher Personnel).

The combined and relative predictive power of objective tests of intelligence and arithmetic were investigated by Rutter (158), Peel and Rutter (140), Emmett and Wilmut (53), Richardson (157), and Sutherland (173). Where intelligence tests were compared with other tests, all workers reported the clear superiority of a verbal intelligence test as the best *single* predictor.

The predictive value of new type objective tests was compared with that of school examinations and old type examinations in English and arithmetic. Emmett (52) reported that the school examinations were slightly superior. Nisbet (119) reported that English composition added slightly to the predictive power of a team of objective tests, and Sutherland (174) reported that tests of problem arithmetic were superior to an objective test of arithmetic. Peel and Armstrong (137) and Wiseman (205) produced convincing evidence of the predictive value of English composition in secondary selection.

Bosomworth (18, 19) showed that primary-school teachers' estimates of school attainment adjusted for interschool differences can be the most predictive part of the selection procedure.

The role of tests of interest in connection with choosing a grammar or a technical secondary education was examined by Peel (136), Watts and Slater (196), Fitzpatrick and Wiseman (62), Wiseman (206), and Wrigley (208). All confirmed the value of interest tests in which the fields of practical and academic interests were utilized.

Turning to the assessment of personality, Walker's survey (192) of the use of school records showed that they had only limited value as a record of the whole class but could be used with advantage to record those things about the pupils that appear significant to the teacher. P. E. Vernon (183) was concerned only incidentally with education, but one of his conclusions was that personality ratings seldom contribute more to selection than school marks.

Borderline problems at the age 11-plus examination, misfits and failures in secondary-school progress, and premature school leaving have also been the subjects of research study. Pilliner (146) related the position and size of the borderline group to test standards and test reliabilities; Hewitt (77) inquired into the grammar-school performance of 11-plus failures who were subsequently admitted to grammar schools. Wrigley also commented on this problem (209). Parnell and others (127) investigated successful entrants to grammar schools and suggested that too many ectomorphs tended to be admitted. The causes of premature leaving were investigated by Collins (36) and in the Ministry of Education pamphlet (112).

Guidance from the upper forms of grammar schools to universities and colleges was investigated by Williams (201). Dale (41, 42, 43) studied the prognostic value of university entrance examinations and the role of psychological tests in university selection. The effect upon undergraduate performance of doing military service before going up to university was studied by Brown and M'Comisky (22). Himmelweit and Summerfield (82) gave cognitive and noncognitive tests to 232 university students taking economics and commerce final degrees and found a usefully predictive correlation. They also analyzed the backgrounds of overachievers and underachievers.

Mental and Physical Development

Research into the topic of development fell into the four main groups of intellectual development, development in school attainment, development of interests and attitudes out of school, and physical development.

Anstey and others (5) tested a group of 500 army recruits and showed clear-cut differences in test performances between groups with different educational backgrounds. Stewart and Jones (170) showed that the verbal ability of a bilingual pupil is affected by "reading" experience, and Watts (197) found evidence that university training in mathematics raised intelligence scores. Lovell (100) discovered a mental factor, the ability to "categorize," and linked its presence or absence with mental stimulation or nonstimulation in young adults.

Peel and Graham (138, 139) and Graham (68) took up the question of differentiation of mental ability with age over the age range of 9 to 11 years. They found no evidence of differentiation and a little evidence of integration, and they suggested that statistical factors might have influenced their results. Dunsdon and Fraser Roberts (48) tested a large sample of 5- to 15-year-olds with four vocabulary tests and found consistent and significant sex differences in favor of boys. Carpenter (32) and Lunzer (103) carried out adaptations of Piaget's experiments on concept formation and commented on Piaget's sequence in terms of the mental ages of the children tested and other factors.

Fitzpatrick (61) suggested that the IQ's of feeble-minded adults tend to be higher than usually assumed and suggested reasons for this discrepancy. Reed (153) carried out a small survey of the incidence of auditory high-frequency weakness among school children.

Research into development in school attainment included carefully designed study (111) of reading ability. Reading backwardness in primary and secondary modern schools was discovered to be greater than before the war. Curr and Evans (39) produced evidence that activity methods lead to slightly improved arithmetic and English attainments in a primary school. Croft (38) surveyed backward pupils in a secondary modern school. Hughes (85) investigated primary-school children's choices of activities and related them to educational organization; and Kemp (94) found that the main environmental and "outside" factors determining attainments in primary schools were intelligence level, socioeconomic status, large school enrolment, and good morale. Schonfield (161) demonstrated that special difficulties are met by retarded readers at an RA of 8-plus. M. D. Vernon (178) surveyed research bearing on the improvement of reading, and P. E. Vernon and others (189) compared the basic attainments of Scottish and English children at the ages of 8, 11, and 11-plus and found Scottish children to be markedly advanced in formal subjects at eight, but less so later. Nayar (115, 116) analyzed the spelling difficulties of secondary modern school pupils and compared groups of English and Indian children.

With regard to outside school interests, attitudes, and preferences of pupils, Pennington (142) studied the active, passive, and intellectual leisure-time interests of secondary-school pupils, using forced choice vocabulary tests; Stewart (169) used questionnaires for a similar purpose. Wall and Simson (190, 191) investigated the effects of films upon adolescents; Williams (200) compared the magazine reading of grammar and secondary modern children; and McKellar and Harris (105) used group discussion, interview, and questionnaire methods for investigating the radio preferences of children. Burns (26) showed how prevalent newspaper reading is among secondary modern school children and McNeille (107) revealed that televiewing was extensive among grammar-school girls, but less so in the upper forms. Whitehead (198) investigated the attitude of grammar-school pupils toward 12 novels read in school.

Research into physical development included the study of Oliver and Chesworth (124) of the physical characteristics of educationally subnormal boys, the investigation by Steel (168) on the effect of mental practice on the acquisition of a motor skill, and the studies by Adamson

(1, 2, 3) on the effect of overload on the physical fitness of boys and of developmental training on physical fitness. Highmore and Taylor (79) analyzed the athletic ability of a sample of 11-year-olds into a general factor and three overlapping group factors of sporting events, games tests, and jumping. Bull (23) reported on physical tests at the secondary level.

Language Arts, Fine Arts, Natural Sciences, and Mathematics

Research into the writing of English included the monograph (151) by Pym on the development of free writing, and the experiment by Carsley (33) for inducing older pupils in secondary modern schools to become discriminating and independent readers. The positive results of his work were shown in the quality of the book reviews written by the pupils about material they had read. Two researches concerned the appreciation and judgment of poetry. Gunn (69) factor-analyzed the ratings of a collection of poems by grammar-school pupils and undergraduates and found a general esthetic factor and a bipolar "technical" factor contrasting rhythm and rhyme with comprehension, mental imagery, and appeal. In Britton's study (21) 15 poems were selected, eight true and seven false (with nothing to communicate). They were subdivided into simple and complex poems and those revealing restrained or abandoned feeling. Boys and scientists tended to choose false poetry and undergraduates as a whole preferred simple poetry. When the test was repeated after some six months, there was an over-all improvement of judgment.

Research into the teaching of modern languages included Burns' investigation (25) into the French vocabulary of first-year forms in boys grammar schools; the greatest increase took place in the first term. Recall accounted for 60 percent, and recognition accounted for 76 percent of vocabulary encountered during the year. Halloran (70) found that a preliminary course of Esperanto helped the later learning of French by less intelligent pupils, whereas the abler pupils were better served by going straight on to French. Neale (117) inquired into the growth of reading ability in French during the grammar school, and Purvis (150) showed that first-year commercial-school pupils could profitably begin French reading halfway thru the first term.

Contributions on topics from the fine arts included the papers by Mainwaring (108) on the factors entering into the teaching of music and the summary by Peel (134) on the contributions of psychology to the teaching of art.

Chapman and Coulson (34) showed that science classes tended to be too large, that there was an excessive drift of scientists away from schools, and that the provision of laboratory assistance was unsatisfactory. Ramsay (152) related efficiency of sixth-form science teaching to equipment and other factors and also surveyed the aims of science teaching. Peel (135) discussed the bearings of psychological research upon the learning of science. Hallworth (71) showed that group methods of learning geography produced no decrease in standard of attainment and definitely improved attitude toward geography. Long (99) investigated children's reactions to geographical pictures.

As regards mathematics, Hamza (74) drew attention to the extent of retardation in mathematics in secondary schools and noted the deficiency of retarded pupils in visual imagery. Storer (171, 172) described a survey of attainment in algebra of some 1100 boys and girls in their fourth year of grammar-school life. The errors made were analyzed and the implications discussed. Renwick (154) produced evidence relating to the teaching of algebra, and Lee (98) related factors of mental and mathematical ability to attainment in grammar-school mathematics. Meddleton (109) verified the value of systematic revision of number facts in the teaching of arithmetic, and Lee (97) described a program, based on experimental material, of diagnostic and remedial work in arithmetic. Thyne (176) reported a thoro investigation of the errors made when infant-school children carry out simple addition and subtraction number facts. Heavyside (75) examined the relationship between complexity and difficulty in arithmetic, and Sutherland (173) studied pupils' attainments in arithmetic upon entering secondary schools.

Research Methods

There are only a few papers devoted explicitly to research methods, but new methods and designs of experiments were utilized in several of the researches so far described. Papers dealing with research include two on group research. Meiklejohn (110) described an experiment intended to give teachers an opportunity of sharing in large research projects, and Hughes (86) described a group research carried out by the students of an education department and showed how the project could be integrated with the course of teacher training.

Turning to statistical methodology, Peaker (130) described a sampling design suitable for use when a random sample of pupils is desired from schools of different sizes. Edwards (51) considered sociometric measures used in group dynamics in terms of the theory of chance and suggested modifications and a simpler method of collecting sociometric data. Vernon (182) examined the application of factorial analysis to test items, and Burt (29) described and illustrated it with an example of his method of group factor analysis. A later paper by Moursy (113) demonstrated the application of this method.

Special Programs

Among programs for exceptional children, workers have investigated programs of remedial education and the education of E. S. N. children and of cerebral palsied children. Special programs investigated also included the work of county colleges, education welfare departments, and the education of prisoners.

Birch (13) surveyed the reading ability of the children of an industrial community, revealing 20-percent backwardness; he made suggestions for remedial education. Valentine (177) analyzed the improvement in basic attainments and conduct following upon remedial education. Curr and Gourlay (40) eliminated practice effects and statistical regression from the "gains" made by pupils undergoing a remedial program and found that the pupils selected by tests gained more than pupils selected by teachers, but that the difference in the gains was not statistically significant.

The beginnings of a reader scheme for E. S. N. children were investigated and set out by Saban (159). J. N. Oliver (122) surveyed the physical characteristics of E. S. N. children and suggested the material and exercises for physical education suitable to their needs. Dunsdon (47) inquired into the incidence, defects, and etiology of cerebral palsied children in England and concluded with suggestions for their educational care.

Eppel and Eppel (55) first investigated the needs, interests, and attitudes of some 380 young workers attending a county college. Marked patterns of interest were found in the fields of job, leisure, and personal relationships. A scheme of education (56) was then drawn up embodying findings of the inquiry. Pitts and Simon (147) carried out a full educational and psychological survey of a group of male prisoners. Giles (66) surveyed the contribution of Education Welfare Departments to the Children's Services and drew inferences for their future development.

Teacher Personnel

Vernon (184) found grounds for improvement in the psychological training given to students training for teachers. Hines (83) carried out experiments on activity methods in the training of teachers and obtained positive results. A comprehensive survey by Sutherland (175) showed that students admitted to train as teachers in Scotland under the postwar emergency scheme held their own with the normal students. Hitchman (84) surveyed the teaching of spoken English in primary training colleges.

The problem of assessing teaching ability was investigated by Evans (57) who found that expert opinion was the best of four not entirely satisfactory criteria. J. N. Oliver (120) found that factors associated with general teaching power, personal quality, and knowledge of subjectmatter entered into the assessments of student teachers of physical education. The attainments of students in training was the subject of inquiry by Black (16) who found evidence of considerable error in students' understanding of what they read. Cleugh (35) asked some 100 teachers who had been thru an advanced diploma course for experienced teachers for their views about written examinations in such a course. The majority (79 percent) felt that such examinations were desirable and necessary. Evans (58, 59) investigated the attitudes toward teaching as a career of senior pupils (boys and girls) in grammar schools and students in two- and four-year courses and related the attitudes to other variables.

Selection of teachers formed the subjectmatter of papers by Burroughs (27) on the sex differences found when students are interviewed by differently constituted panels. Women students obtained higher marks for speech, enthusiasm, and suitability for teaching. Shuker (165) related training-college marks with School Certificate performance, and Warburton and Allen (194) followed up exceptional entrants to training colleges. Allen, Langan, and Warburton (4) showed that group selection procedures increased the efficiency of selection for training colleges.

Conclusion

This review has had to be brief and hence has suffered a little in the condensing process, but it should make clear that some work has been carried out on problems relating to educational measurement, educational psychology and sociology and to the problem of guidance. Work has been carried out in other fields, but more attention should be given in the future to learning and teaching problems in the classroom relating them, perhaps, to psychological results and theory.

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Guidance and Counseling

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This issue of the REVIEW was prepared by the
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INTRODUCTION

It is now 24 years since the Review of Educational Research first devoted an issue to guidance. The last issue concerned with this topic was published in April 1954.

The reader may note some changes in this issue as compared with the last. The organization and administration of guidance is taken up in one chapter rather than two. A new chapter has been added on philosophical aspects of guidance. It was felt that this has become an area which is increasingly recognized even tho there may still be a paucity of research. A chapter on tests and measurements has been omitted since one issue of the Review is devoted entirely to this subject. Group guidance and group therapy are covered in one chapter rather than two, as in the previous issue. As before, a chapter is devoted to the vital role of the teacher in the guidance program.

The chairman wishes to express his appreciation to the members of the committee and to the contributors.

Dugald S. Arbuckle, *Chairman*
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CHAPTER I

The Organization and Administration of Guidance Services

GORDON V. ANDERSON

PROBLEMS of the organization and administration of guidance services include concern with the need for such services, formulation of policy and determination of objectives, staff problems, qualifications and duties for the various positions needed to achieve the objectives, staff relationships, problems of relationships with other educational and public welfare agencies, as well as publicity and public relations. After the functions of an agency have been defined, attention should be given to insuring their being discharged. To do this effectively, it is important that those whom it has been organized to serve are fully aware of its availability, perceive its functions and scope correctly, and have positive attitudes toward it. Problems of training, both preservice and inservice, and the task of evaluation also fall within the province of administration but will not be dealt with in the present chapter since treatment of the research in these areas is given elsewhere in this issue.

The research picture for the organization and administration of personnel services, during the three-year period from September 1953 to September 1956, appears to be somewhat brighter than was true for either of the two preceding triennia. This may represent differences in the definition of research studies rather than an increase in attention to these problems. Most studies reported during the past three years which can be classified as research are descriptive rather than analytical or experimental. However, if research progress is to be made, these studies will play an important part by bringing out the problems in relation to the level of development attained by guidance services.

Purposes and Objectives

Guidance services have been justified in two general ways. On one hand, it has been pretty well established that young people at all educational levels face problems which can be solved more adequately thru the use of professional help; but further than that, our educational system has been developed to meet the existing wide range of individual differences in needs and abilities. Guidance services are necessary to make this latter principle functional. Krugman (34) pointed out that guidance is needed at the lower levels in education as well as at the higher ones. The need for guidance does not suddenly emerge when the elementary school is left behind, and good guidance at the lower levels, like early attention to health, results in more positive benefits from measures taken later.

Personnel services are directed primarily at the self-realization of the individual. They are not viewed as a measure for effecting better utilization of human resources *per se*. But when the individual is able thru wise guidance to build a more effective life, society also benefits. We can afford less and less the possible waste of specialized talent as Wolfle (53) so clearly pointed out in stressing the implications of his findings, which are a strong challenge to the guidance function.

Several studies have been made to ascertain students' needs for counseling and guidance service. The *Mooney Problem Checklist* was used in a cooperative study reported by Morris (41). Adjustment to schoolwork was the area of greatest difficulty, with relatively few home and family or moral and religious problems. The need for appropriate guidance service was clearly indicated. McGowan (38) reported somewhat different findings from a study of 296 junior high-school students who responded to a questionnaire on interests, happiness level, long-range goals, and related topics. These students showed wide acquaintance with and interest in occupations; 4 out of 5 planned to go on to college. The principal adjustment problems centered in the home and school. Williams (51) administered a questionnaire to 279 high-school freshmen, about equal numbers of boys and girls, who also revealed a concern with school problems; many responses pointed toward maladjustment in the home. The majority had solved financial problems, and more than three-fourths had definite post-high-school plans, with all stating a vocational preference. Most students desired more help with personality development and the acquisition of social skills. Julius (29) surveyed 20 high schools including 15,109 pupils and found a weakness in vocational guidance which was most sharply evident by the senior year.

When more is known about the students served, the administrative problems of a personnel program are more easily solved. Gaudet and Kulick (16) found scores for their guidance center clients corresponded closely to norms on the *Minnesota Personality Scale*. That the scale was sufficiently sensitive was indicated by clear differentials obtained between students coming to the center for help with emotional and social adjustment problems and those coming for help with educational and vocational problems. Differences in score distributions on the social adjustment, family relations, and emotional adjustment scales were in the expected direction. Abrahamson (1) studied cases served by the counseling center of the University of Washington according to kind of help sought. Using a sample of cases drawn from a three-year period, he found that freshmen were represented in the largest numbers, with numbers from each higher class level being progressively smaller. Over 80 percent presented problems of the choice or appropriateness of major field of study or vocational goal; between 15 and 20 percent came to the center for help with personal problems of a social or emotional nature.

Closely related to the question of what needs are felt by students is that of identifying those who should be counseled. Kingston (31) found that of 1276 college freshmen, 952 listed 1432 problems with which they needed help, with only 324 indicating no problems. Held (22) drew attention to the unique counseling needs of students with nonacademic abilities and/or interests. In his program, objective tests were used to identify these students. Gifted students constitute another special group of potential counselees. A program in which the top one-half of 1 percent of students in measured ability were given special attention was described by Barbour (5). He found that work with these students called for considerable extra time.

A somewhat different approach to the question of the need for personnel services was taken by the authors of *Counseling and Guidance in General Education* (20). They indicated that an adequate college program is a combination of four ingredients: general education, specialized training, extracurriculum activities, and personnel services. These are logically interconnected. All four must be harmonized in the total experience and adjustment of the student. The development of self-understanding, growth in maturity, and the acquisition of values, all of which are the fruits of wise guidance, are in themselves important components of a general education. Furthermore, counseling is an integrating influence thru which all the experiences and insights acquired in the varied areas of college life, both in and out of the classroom, can be harmonized into a consistent and effective life plan and pattern for the individual student.

Organizing and Administering Guidance Services

Practices and approaches for organizing and administering guidance services are based in very small part on research findings. Experience in programs of personnel services and consensus among leaders in the field are used as guides for those who initiate these services. Several useful monographs and textbooks were published during the three years under review. Mathewson (40) gave wise counsel in his thoughtful and clearly written monograph. Roeber, Smith, and Erickson's revision (45) was an excellent guide for the administrator and was a marked improvement over its predecessor. In both these approaches, two firmly established principles of modern guidance were stressed. One is the concept of a team approach to work with the individual, with the guidance specialist functioning more frequently as a consultant than in a direct relationship with the student. The other principle is best identified by a negative: avoid "fragmentation" of the student. The monograph by Humphreys and Traxler (24) included an excellent chapter on organization and one on staffing.

With special reference to personnel work in higher education, Williamson (52) suggested that there are seven vector forces which have influenced the character of college student counseling programs. One of these is the counseling fraternity itself—the research progress which has been made and the move toward professionalization of counseling. A second is the academic emphasis on intellectual learning; a third, the attitudes of parents and their expectations. Varying emphases and uneven development among the several phases of a counseling program are a fourth vector force; and public relations problems, a fifth. Budget realities, more often hampering than otherwise, are a significant vector force. The last is the relation of counseling to other student personnel services, for example, to discipline. This thoughtful analysis was rich in potential for research hypotheses in this area where more definitive research is greatly needed.

Inlow (26) directed attention to some conflicts between theory and practice in education which have implications for the organization of guidance services and which deserve careful research attention. Centralization of personnel services appears to have the strongest case at present, carrying with it certainty of adequate professional preparation, clearly defined leadership and responsibility, and greater economy and efficiency. At the same time, the prevailing philosophy is moving more and more strongly to the view that guidance should not be separated from the other functions and activities of the school if it is to be most effective. Jamrich (27) gave attention to this question at the college level in a survey to discover how student-faculty advisement was organized. His respondents divided about equally between assigning responsibility to a personnel specialist and assigning responsibility to an academic administrator.

The basic records used in the counseling program of the Veterans' Administration and the assumptions which underlie them were described and discussed by Cooperman and others (13). The assumptions identified dealt with the influence of records on counseling practice and effectiveness. They stand almost as research hypotheses and deserve the attention of investigators.

Ways in which a county superintendent's office can aid in guidance work were brought out in a study made by Bowman (11), who surveyed all county superintendents in Pennsylvania, using a questionnaire which outlined 115 possible guidance services. He concluded that local schools would profit most from help at the level of organization, coordination, training, evaluation, and interpretation. The questions of client fees, staff assignment, and private practice by university and college counselors were studied by Barnett (6) who surveyed 54 counseling centers. Policies regarding these points were so varied as to show no prevailing trend. Suitable criteria against which administrative policies of this sort can be measured are in need of development.

Statistical data concerning the field of counseling are of use both to administrators and research workers. Jones and Miller (28) assembled a great deal of such information. Their tables presented the number and distribution of counselors in public schools by size of community and by junior or senior high school. They reported that the average number of pupils per counselor was 605, but with wide variations from state to state. Certification data and statistics on costs of guidance services were also given.

Staff Duties and Relationships

Several studies analyzed the duties of guidance staff members. Kearney (30) defined the roles and duties of the guidance director, the principal, and the classroom teacher in an elementary-school guidance program. From his analysis he suggested a guidance director for each 300 to 500 pupils. Hoyt (23) assumed that 50 percent of the director's time is spent in counseling, but his estimate of pupil load agrees well, with a counselor needed for every 400 pupils. Newman (43) worked out a job description for the elementary-school counselor; he allotted only 12 percent of the time for individual counseling. Block (10) obtained questionnaire responses from 182 secondary-school administrators who described desirable qualities of a school counselor. She also reported views on administrative policies and relationships which affected the work of the counselor. Another study of the small-school counselor's job was made by Truax (48), who used the critical incident technic. He obtained 1123 incidents from 305 respondents. Seven areas of counselor behavior were defined. Wendorf (50) surveyed all the schools in Ohio by questionnaire and concluded that practicing counselors do not measure up too well professionally. The majority of counselors were found to possess little or no professional training.

The position of the college counselor was given attention by Greene (18) who reported a survey showing that 70 percent of the institutions in his sample gave academic rank to counselors and about 65 percent gave them tenure. Koile (33) developed an interest measure for selecting faculty counselors; it had high reliability and differentiated clearly between counseling and noncounseling college teachers. His sample included 500 faculty members of 46 colleges in 25 states.

Two studies are representative of job analysis for specialized guidance workers. MacDonnell (37) used a rating scale to define the most essential duties as well as the general nature of the position of citywide director of guidance. He found little variation in the position among cities of different sizes. Uhrbrock (49) analyzed the position of college placement officer, basing his study on the published literature.

Smith (47) gave attention to an interesting problem of staff relationships, using personnel data about students with two groups of instructors widely divergent in their guidance attitudes. His follow-up work showed that both groups profited greatly from the use of the data, and relations between the counseling office and the instructional staff were improved.

Relations between school guidance services and other school or community agencies were given some attention. Gendel and Gellman (17) discussed their experience in two programs of collaboration with medical personnel. In the one the guidance worker functioned as a member of a team; in the other the counselor was used as a consultant. Asch and Kendall (4) described a program in which guidance and consultant services were extended to the whole community by the college center. Difficult problems arose, but the general value appeared to be high.

Relations between school guidance and public employment service facilities were the subject of two studies. Anderson (3) worked out a program in which high schools in the rural area cooperated with the U. S. Employment Service in Salt Lake City to help graduating seniors bridge the gap between high school and vocational adjustment. Odell (44) investigated school employment service cooperation in 11 states to determine the benefits to young applicants, the costs, and the best methods of counseling, testing, and placement. The data were obtained by a questionnaire follow-up of graduating seniors. Murray (42) described the specific administrative steps, personnel involved, and procedures for placement of either high-school or college students thru cooperative efforts of both the school and the U. S. Employment Service office.

Publicity and Public Relations

An important task in the administration of guidance service is maintaining good relations both with those who are expected to use the service and with the general public. Problems in maintaining controls make definitive research in this area very difficult. In the last three years all reports concerned with these problems have been case studies. Ames (2) described use of an occupational survey which had a positive effect on the public understanding and acceptance of the work of a school guidance department. Brown (12) described 12 ways in which the guidance department of the Melbourne, Florida, high school created news for local newspapers. He found that confidence in the program was increased as a result of this aggressive public relations approach and that there was a generally better knowledge of where to turn when guidance problems arose. Harris (21) found that group approaches worked very well for opening up channels of communication and developing better attitudes toward guidance.

Berdie (9) defined seven public relations objectives for a university counseling center. Specific efforts to attain these fell in three general areas: communication with students, staff relationships, and extrainstitutional relationships.

Guidance in Action

Many descriptions of school and college guidance programs appeared in the literature during the period under review. Usually only successful programs were discussed. While the reports were useful in providing suggestions for research, they did not lend themselves well to comparative studies. Beck (8) illustrated the feasibility of the cooperative use of cumulative records by several schools; there was a gain both in efficiency and effectiveness. Davis and Wickes (14) described a unique program of guidance involving counselor and teacher. Research to analyze this program is in progress. A research investigation of the growth of psychological services in Nassau County, New York, was described by Salten, Elkin, and

Trachtman (46). Using a remarkably successful questionnaire approach, they found growth and improvement in all areas.

A special service for the selection and counseling of prospective teachers was described by MacLean, Gowan, and Gowan (39). The results of tests of ability, attitudes, and personality were presented, together with a description of the typical teacher-in-training at their institution.

Faculty counseling programs were described by two investigators. Koile (32) pointed up the growth in effectiveness over a seven-year period of a state teachers-college program which was planned and executed by the faculty of the school under the leadership of a guidance specialist. Huntley (25) described a plan for faculty counseling which provided for students to freely choose a faculty adviser from a selected list. Both strong and weak points in this approach were reviewed.

Guidance Services Worldwide

Comparative studies of the organization and administration of guidance services have recently become international in scope. The 1955 *Yearbook of Education* (19) was devoted to guidance and counseling, and presented a worldwide picture. One is quickly impressed with the differences in definition of guidance from one country to another, and the way in which political philosophies reflect themselves in patterns of organization and administration.

Lloyd (35) reported the development of guidance in Japanese universities thru the work of an institute staffed by specialists from American colleges and universities; in a later report (36) he presented the conclusions reached from 200 conferences held in 23 countries of Europe, Asia, and Africa. Lloyd cited a lag among foreign universities in the utilization of findings from the behavioral sciences, preventing the development of technical guidance and personnel services for students. Eells (15) reported earlier development in educational personnel services which preceded the work of the institute among the Japanese universities, and Beals (7) described a project in Turkey designed to improve guidance services in the educational programs of that country.

Counseling and student personnel services are uniquely characteristic of the American culture. Educators thruout the world turn to us for leadership. The present review, however, shows clearly that we still have many unsolved problems of organization and administration, and much research and study are needed to narrow the gap between theory and practice.

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CHAPTER II

The Preparation of Counselors and Personnel Workers

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THE literature related to the preparation of counselors and personnel workers published during the past three years indicates that there is much to be accomplished in the development of adequate programs for professional preparation, but progress is being made in some significant areas.

Much of the literature on counselor education consists of status studies and descriptive reports. The questionnaire is still more popular than its present stage of refinement merits. Research on the importance of counselor characteristics and technics in the counseling process and studies designed to learn how to evaluate the outcomes of counseling are reviewed elsewhere in this issue. Such research is an essential element in the improvement of counselor preparation.

The literature reflects the existing confusion regarding terminology and disciplinary relationships. This same confusion makes it difficult to determine content for this review. This chapter deals only with the preparation of those persons who are known professionally as counselors, school guidance workers, or student personnel workers, and excludes school psychologists, school social workers, clinical psychologists, and persons in allied fields who also counsel and have other responsibilities closely related to personnel work.

Selection Procedures

Colleges and universities have a moral obligation to the prospective counselor and to society to develop and apply selection technics which will increase the probability that only those who have the potential to become successful counselors enter or remain in training. The ability, background, and personal attributes of students who are preparing for guidance work are important determinants of the experiences which should be included in a counselor education program. These factors also determine in part the level of competency to be expected of graduates of these programs.

Selection should begin early (14, 34). Acceptance should mean that the institution has assumed an obligation to help the trainee succeed. In addition to admissions criteria, success during the first semester and in field experience work may be used as a basis for selection (or retention).

Surveys of the current status of selection were reported by Wellman (54) and two committees of professional associations (1, 4). Selection policies vary from none at all to rigorous screening processes.

The most frequently reported criterion for admission is academic ability as indicated by over-all grade average and/or tests such as the *Miller Analogies Test*, the *Ohio State University Psychological Examination*, and the *Graduate Record Examinations*. The interview is used by most institutions primarily to evaluate interest, maturity, and personal-social adjustment. Altho an undergraduate major in psychology or education is usually recommended, only a few institutions include this as a specific requirement. Teaching or other types of work experience are generally recommended and frequently required. There is an increasing use of technics to evaluate interests and personality characteristics.

Clendenen (13) presented a paper which included an analytical discussion of selection problems and described policies at the University of California at Los Angeles. Wilson and Robbins (56) developed a procedure for appraising the extent to which candidates could relate to each other as professional workers. The leaderless group technic was used for discussion of a guidance problem by candidates, with judges observing thru a one-way vision screen. Of the 58 candidates who qualified in the top two intervals on scholarship and reference criteria, only 22 fell in the top two intervals on the assessment of interpersonal effectiveness; it was felt that this criterion had considerable uniqueness. Evaluative studies of this selection device were reported to be in progress.

Evaluation of Selection

There is general dissatisfaction with selection procedures. In one survey (4) 10 out of 21 institutions reported that research was under way in the evaluation of selection methods. However, many of the respondents indicated that they did not know the essential traits on which to select. Forty-three percent of the counselor trainers surveyed by Wellman (54) indicated that they evaluated selection by course marks and follow-up, but the results of these evaluations were in rather general terms indicating much difficulty in making an objective evaluation.

No significant longitudinal research on the validity of selection technics was found in the literature. Good scholarship is important but does not guarantee good counseling ability. There are few available data concerning the level of academic ability which is needed in order to complete successfully any one of the many types of training programs for counselors and personnel workers. Yet heavy emphasis is placed on the applicant's academic record and often on tests of academic ability. Tyler (52) suggested as one justification for this emphasis the probability that those selected will be "persons who *need* not feel overly anxious about their abilities, defensive about their performance, or too conscious of competition."

Clendenen (13) found that good trainees usually have an A or B rating in three scales on the Strong *Vocational Interest Blank for Men*, most frequently the Scientific, Social Welfare, and Literary. Extremely high Social Welfare scores, however, were not associated with superior counseling aptitude.

There was little evidence of attempts to validate or to improve the interview. Apparently the effect of research on counselor judgments and interviewing technics has been minimal in this area.

Recommended Standards

Significant recommendations by professional groups from 1950 to 1953 were reviewed by Burnett (12). In 1954 the ACPA Professional Standards Committee (1) recommended a set of standards to be used for admission to graduate training programs in student personnel work. These standards stressed academic proficiency, teaching or other related experience, breadth of background, interest in the field, personal adjustment, and nine "desirable" character and personality qualities. The brief suggestions for evaluating the extent to which candidates meet the criteria listed reflect the inadequacy of research on selection.

School and college personnel workers should understand learning problems, work closely with teachers and school administrators, and contribute to a healthy school environment (31, 41, 52). State certification regulations require teaching experience for guidance workers in public schools (11). Mathewson (32) recommended that the professional training for the general guidance counselor should be preceded by 24 hours of undergraduate work in psychology and sociology, that the candidate should have had teaching experience, and that he should meet high standards of intelligence and personality.

Research reviewed in Chapter IV of this issue suggested the importance of selection criteria which take into account the personal attributes of counselors. Evidence is beginning to accumulate about the factors in counseling which are influenced by counselor personality and attitudes (47, 57). Current research suggests that the applicant should have qualities, such as the following, to a somewhat greater degree than the average graduate student: intellectual ability, social welfare and scientific interests, security, awareness of his own anxieties and modes of reducing them, and absence of symptoms of neuroticism and of overpowering self-interest. He needs other less well-defined attributes which enable him to function as a practitioner-scientist who has faith in the potential of others, who understands and accepts himself and others, and who is comfortable in interpersonal relationships.

The Personal Characteristics of Counselors

Daane (20) found differing patterns of scores on the *Minnesota Multiphasic Personality Inventory* for counselors with high and with low empathy scores. Lifton (31) studied the relations between empathy and esthetic sensitivity. A music reaction test was developed, and test results initially showed correlations with measures of empathy of as high as

Rho = .63. These relationships, however, did not stand up over a six-month period.

Norman and Ainsworth (39) used the self-other judgment approach to study a group of male college freshmen and found that empathy was positively related to reality and that both correlated more closely with adjustment than did projection. Parker (40) concluded that altho empathy can be defined operationally and is testable, its causal nature has not been demonstrated, and, therefore, research is needed to discover whether it can be developed or whether it is an intangible something with which a person is born.

Arbuckle (9) administered the *Minnesota Multiphasic Personality Inventory*, the *Heston Personality Inventory*, and the *Kuder Preference Record* (Form BM) to 70 counselor trainees. Later he asked them to select from among their fellow students in the course those to whom they would be most apt and those to whom they would be least apt to go for counseling. He found significant differences on several scales. The *MMPI* had the greatest number of differentiating scales. Arbuckle also had asked these 70 students to list the characteristics, traits, or attitudes that they would most like and least like in a counselor. Altho most of the traits mentioned were not comparable with the personality differences as determined by the measures used, it was theorized that many of them might be correlates of these characteristics. These findings suggest a fruitful area for research.

Snyder (50) administered the *MMPI* to 423 students in a course in introduction to clinical psychology. Several semesters later he obtained prediction ratings from four psychology professors on each of these students. Attempts to construct a valid *MMPI* scale which would differentiate between the good and poor groups were unsuccessful. Snyder found that the good students were more aggressive, independent, unconventional, intellectual, and social, and were less religious. Poor students tended to have feelings of inadequacy and neurotic concerns. The nature of some of the differentiating characteristics suggests that clichés regarding desirable counselor characteristics need to be subjected to penetrating research.

In a series of articles, Cottle and his co-workers (16, 17, 18, 19) described in some detail the construction of an experimental attitude scale to differentiate between counselors and teachers. The scale was based on items derived from the *Minnesota Multiphasic Personality Inventory*, the *Guilford-Zimmerman Temperament Survey*, and the Strong *Vocational Interest Blank for Men*. Keys were developed for male college counselors, male high-school counselors, and for female high-school counselors.

In his address as retiring president of the Division of Counseling Psychology, Hahn (23) hypothesized differences in interests between clinical psychologists and counseling psychologists. In view of the difficulties experienced by psychologists and other guidance workers in attempting to differentiate among the several related professional groups, the testing of these hypotheses will not be easy.

Programs for the Preparation of Counselors and Personnel Workers

Altho the past few years have seen much progress toward agreement regarding the general areas which should be included in counselor training (12, 57), there is still much diversity in content, technics, and organization or programs for the professional preparation of counselors. The continuous task of improving the content and technics of counselor preparation is complicated by interprofessional relationships, the lack of information on pertinent details of job responsibilities, problems of semantics, the need for further knowledge of the counseling process, and the inadequacy of evaluative criteria and procedures.

A committee of the American Personnel and Guidance Association reported that there were at least 205 American colleges and universities which had programs for the preparation of school counselors. The committee divided the numerous courses available into seven major areas (2). Miller's survey (36) revealed significant differences in facilities and requirements among 157 colleges and universities. The problem of differentiating between the preparation and functions of clinical and counseling psychologists was discussed extensively (5, 23, 37, 51). Hadley and Asher (22) described differentiating aspects of a program which provided for specialization in either clinical or counseling psychology. They pointed out that differences were tenuous and that it was possible for a student to meet the requirements of both options.

Evaluation of Programs

Many counselors and guidance directors feel the need for a better planned preparation in terms of relative emphases on many aspects of their work, coordination of courses, and practical application of theory (41). The preparation of some counselors has not enabled them to recognize inadequacies in their preparation nor given them an understanding of their role (26). The tendency of students to look elsewhere for some types of help which counselors are supposed to be uniquely qualified to provide raises many questions regarding directions and emphases in counselor preparation (21).

Noble and Mathewson (38) experimented with group conferences as an evaluative device and concluded that they contributed to the stimulation and free expression of ideas that can improve counselor education.

Recommended Programs

Mathewson (33) proposed a two-year sequence for the preparation of the general counselor, the content of which he related closely to an analysis of appropriate functions. Mathewson (34) also prepared a report of a committee survey in which he analyzed the opinions of 44 guidance directors and 19 counselor trainers in New York State on 10 significant facets of counselor preparation. Cottingham (15) suggested a series of positions and broad training levels for college personnel workers and related these levels to functions.

The lack of uniformity reported by surveys suggests confusion rather than healthy individuality, and there appears to be a need for the development of a set of standards by which our counselor training programs can be evaluated (36). Recommendations by professional groups were reviewed by Burnett (12). Wrenn (57) predicted that the recommendations of the Division of Counseling Psychology would provide a basic structure for the evaluation of doctoral programs. A comparable guide is needed for subdoctoral programs, especially for public-school and junior-college counselors and personnel workers, the majority of whom do not have doctoral training. At least some of the suggestions made by the Committee on Subdoctoral Education of the American Psychological Association (7) would be helpful in the formulation of such a guide.

In connection with the training grants program established by the Office of Vocational Rehabilitation in 1954, the National Rehabilitation Association and the National Vocational Guidance Association (25) published a special bulletin which described the functions and recommended training for rehabilitation counselors. This program rests upon the framework of several professional disciplines and calls for a multidisciplinary approach. Diversity in the settings in which rehabilitation counselors work was discussed in this bulletin and by Hahn (24) who indicated that a new department for training of nonmedical rehabilitation specialists may be needed.

Certification

All but nine states were reported to have certification regulations for public-school counselors or plans for establishing such regulations (11). The most significant development was the adoption in California (effective in 1956) of regulations which provided for a general pupil personnel credential and a common core in the preparation of counselors, social workers, child welfare and attendance workers, psychologists, and psychometrists employed in the public schools of the state. It is probable that there will be increased recognition of the need for flexibility in providing for the many kinds of pupil personnel services and for interrelationships of function among workers. A similar proposition in Mathewson's survey (34) received strong support. Active efforts working toward laws concerning licensing or certification of psychologists who are not employed in public schools were reported by 12 states (2).

Technics

Schwebel (45) discussed role-playing and called attention to the absence of research evidence of its usefulness in counselor training.

Altho students are encouraged to experience personal therapy, this is not a general requirement in training programs, and it was pointed out that psychotherapy is not the only method to help counselors develop an awareness of their own biases and sensitive areas (52). Shor (48) described a "recorder self therapy" technic for use in counselor training to help students understand themselves. Slomowitz (49) compared personality changes and content achievement gains in two parallel classes, one of which was conducted in a nondirectively oriented classroom setting and the other in a problem oriented setting. Schwebel (46) suggested that the counselor might be helped to learn about his own motivation thru small classes specifically designed for that purpose. In the same article, Schwebel called attention to the importance of including training in professional ethics and suggested several ways in which counselor educators might utilize theory as an instrument of problem-solving rather than as an end in learning.

Reports were made on the development and use of instruments to measure empathy (53) and attitudes (27). Earlier in this chapter, reference was made to other studies indicative of the possibilities of measuring significant counselor characteristics and competencies. Wicas (55) developed a device for comparing the response behavior of trainees with that of expert counselors. Items consist of excerpts of client talk extracted from typescripts of actual counseling interviews.

Supervised Experience

A study of practices in 102 colleges and universities was made by a committee of the National Association of Guidance Supervisors and Counselor Trainers (42). Provision for supervised experience was reported by 68 institutions, of which only 18 indicated that some paid internships were available. The picture of variations in experiences and purposes was not unlike findings of the APA committee in its review of internships in clinical psychology (6). There was little uniformity in amount of time spent and in the types of experiences or supervision provided. Small budgets, lack of staff, and nonavailability of qualified agency supervisors were frequently mentioned as major obstacles. Schmidt (44) published a detailed description of the program at Indiana University.

Most of the research on technics for practicum work dealt with the counseling interview. The question of the effect of an observer during an interview was studied by Kadushin (29) who also listed some of the "caveats" to be observed in order to minimize the effect of the observer. Mathewson and Rochlin (35) described technics for the close structured analysis of recorded initial interviews to increase counselor self-awareness and sensitivity to client selt-perception. Anderson and Brown (8) described their use of tape recordings in three stages of supervision, emphasizing that the supervisor is concerned less with specific counselor responses than with the meaning and understanding communicated in the totality of his responses.

Concern for counselor self-understanding, awareness of needs, and the use of the self in counseling was expressed by Sanderson (43) who suggested that in fundamentals of casework supervisor-student relationships were important.

Inservice Education

Evidence of the need for inservice training in counseling and personnel work includes the results of evaluations of school guidance services (reviewed in Chapter VIII) and the significant proportion of school counselors who do not have a master's degree in guidance (3, 28). Obstacles to inservice education include lack of awareness of needs on the part of counselors, the pressures of many and varied duties, the lack of personnel to conduct and supervise the training, the fact that many counselors are counselors because such assignments were given them by the administration or because they hope to become administrators, and the fact that administrators do not encourage sufficiently a climate which promotes inservice growth.

A careful study of inservice training was reported by Kirk (30). She conducted and evaluated an inservice program for 10 counselors in two secondary schools. Four major technics were used: individual conferences, group meetings, case conferences, and case referrals. Evaluative technics included counselor-consultant interviews, questionnaires, group seminars, an information and sentence completion exercise, an attitude inventory, and a test of responses in 10 different counseling situations.

Inservice training appears to be the major technic for the education of the general counselor in elementary schools. The work is new and not well defined, and schools have a preference for those whom they know to be capable and understanding teachers. Cottingham's text (14) included examples of inservice programs for elementary-school counselors, but most of the literature has been confined to discussions of the job and generalizations regarding areas of training. Graduate programs which provide preparation for the unique aspects of the elementary-school counselor's functions are still in the exploratory stage.

Berdie (10) presented a paper on the inservice growth needs of counselors who have completed their formal training. He discussed purposes and current practices which he found to be inadequate for counselors who wished to continue high-level professional work.

Summary

Counseling psychology as a profession has established its directions and is studying the counseling process, its outcomes and its causal bases. Counselor trainers are beginning to attempt to apply the implications of these studies to the selection of students and to the determination of content and technics for counselor preparation. This is the forest. When we look at the trees, we see how limited is our knowledge and how difficult is the attainment of our goals.

In the general field of personnel work there is less clarity of direction, due in part to emphasis on research which bears only indirectly on many of the problems of school and college personnel workers. The need for clarification of semantic difficulties and for analyses of jobs and of worker characteristics continues to be pressing. Several years have passed since the major areas for training in this field were defined. They need refinement based on experience, and probably revision based on changes in worker responsibilities and the new knowledge which has come from research.

The scarcity of research on inservice training and growth should be viewed as a harsh challenge to a profession in which knowledge has increased so rapidly and in which there are known to be many workers whose professional training is, to say the least, limited.

Research suggestions incorporated in this review emphasize the desirability of studies of (a) what the worker does, the way he does it, and what happens as a result; (b) criteria and technics for evaluation; (c) competencies and personal attributes associated with effective practice; and (d) the technics by which these competencies and attributes can be developed and measured.

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CHAPTER III

The Philosophical Aspects of Guidance

JAMES F. MOYNIHAN

IT WAS the opinion of the committee for this issue of the REVIEW that there was a need for a chapter on the philosophy of guidance. However, an investigation of the literature during the past three years proved somewhat disappointing, nor was there any significant improvement when the search was extended to embrace a five-year period. Not only is there a notable scarcity of explicit references under the title, "Philosophy of Guidance," but where reference is made, the treatment is schematic and limited to a paragraph or two in many current textbooks, or to what amounts to *obiter dicta* in the periodical literature. To be sure, principles are stated and assumptions made, but formal discussion of what the philosophy of guidance is or means is surprisingly lacking. Kneller (16) stated that if textbooks in the field are any criterion, we have little proof that guidance counselors are fully aware of the philosophical assumptions toward which they gravitate or that they are seriously interested in them.

There may be several reasons for this current situation. Philosophy is a field which does not lend itself readily to experimental investigation. The influence of American positivism, with its emphasis on operationism as opposed to theory, may have had the same effect on guidance which Allport (1) noted relative to the field of psychology. At the same time, the impact of so many fields on guidance as well as current positions taken on the relationship and/or distinction between guidance and counseling, guidance and education, and personnel work, may have resulted in a confusion on the meaning of guidance itself.

Recognition of Need

There does appear to be a growing realization of a need for more explicit clarification of the philosophical aspects of guidance. Shoben (29), distinguishing between "end theories" which are philosophical and "means" theories, maintained that while student personnel workers use each, sometimes articulately, sometimes only implicitly, both are needed for productive professional life. At the same time he stated that there is a need for theoretical precision for effectiveness of services and in order to yield a generalized body of principles upon which others can build. Murphy (23) called attention to the fact that personnel and guidance people are more preoccupied with skills than with the broad perspectives of the function which they are carrying out and suggested that guidance training centers should be directed to view philosophically and in a social context the personalities of both those who guide and those who are guided. Shoben and others (30), attempting to integrate different theoretical positions on behavior, pointed out the need for more adequate explanations of why we behave like human beings. Miller (21) attempted a synthetic theoretical model of behavior using the construct of energy exchange.

Principles and Assumptions

The lack of explicit formulations of a philosophy of guidance does not mean that guidance workers have been operating entirely without one. Cribbin (9), in a survey which included a condensation of an unpublished doctoral dissertation (8), examined the principles, basic concepts, and objectives presented in some 200 or more standard texts and journal articles on guidance during the period 1935-1950. He reduced the material to some 15 principles which might properly be termed "philosophical" and which were held by a majority of leaders in guidance and student personnel work. He further classified 10 major conceptions of guidance as well as some 120 different expressions of aims and objectives. He maintained elsewhere that practically every valid guidance principle is an ancient Christian truth (10). The 1955 *Yearbook of Education* (13) dealt with guidance and counseling in various countries and, devoting a large section to the historical and philosophical background of guidance, pointed out that where guidance is given, certain basic philosophical and social assumptions are made, usually unconsciously.

At the same time it was noted that American guidance, while based primarily on empirical science, has ancestors whose orientation is less restricted and includes both philosophical and theological aspects.

Concept of Man

Philosophy, as such, is interested in and takes a position on the nature of man and the universe. There is evidence that personnel and guidance workers have not been entirely unconcerned with the nature of man even tho there may be a paucity of explicit formulations.

Mathewson (19), whose text is more philosophically orientated than those of most current writers, pointed out that at the foundation of guidance lie ultimate questions about the nature of man and his world. Man is both a part of nature and understandable and measurable in a scientific sense, and "out of nature" in a materialistic sense in that he is also an indeterminate spiritual being. Hence the ultimate concern of guidance is the optimal realization of the individual self consistent with universally valid social obligations, moral values, and religious and spiritual ideals. The increasing concern with the importance of guidance in ethical and religious values which is appearing in the literature (3, 4, 11, 14) would seem to indicate that the current developmental focus of guidance is assuming a broader concept of man which includes his ethical and spiritual dimensions.

Rogers (26) discussed the modification of his concept of man's nature that has taken place as a result of years of clinical experience and research. Walker (39) in a provocative article took the position that Rogers' concepts on the nature of man and his intrinsic goodness make him a successor of Rousseau and not only justify his methodology, but perhaps make it mandatory.

Thruout the literature there are recurrent overtones of a fundamental concept of man as a psychobiological organism, conative, responsible, self-directive, and a flexible participant in his own development and in the societal processes of our American democracy, which concept has been in the literature for some time (2, 40). Guidance workers continue to couple this concept with a respect for what man is and can become as well as with methodological approaches which seek the complete actualization of man's nature, physical, social, intellectual, emotional, and spiritual, both as an individual and as a member of society (19, 32).

Climate Influences

Because guidance in the process of its development from the days of Parsons has come under the influence of many fields, we would expect that its own philosophy would reflect the philosophical positions of each influence. It would, for example, be expected that the philosophy of guidance workers might well be influenced by the educational climate in which they function, particularly those who subscribe to the guidance-as-education concept. Lloyd-Jones and Smith (18), in discussing the influence of the educational philosophies of rationalism, neo-humanism, and instrumentalism, claimed that it is the philosophy of the latter which seems to represent best the principles which student personnel workers maintain and pretend they believe. Dressel (12) took a similar position as regards instrumentalism, but pointed out that most student personnel programs are in the neo-humanist range and differ only in the degree of leaning toward either rationalism or instrumentalism. He credited this to the wide range of faculty views. Parody (24) pointed out that the integration between classroom teaching and guidance which many believe is taking place will not come about normally but must be deliberately planned.

There is also evidence that the philosophy of guidance is influenced by the sociological climate and that this is reflected not only in its methodology but also in its principles and assumptions. Super (34), analyzing the literature and guidance programs in the United States and four European countries, pointed out that such factors as economic stability and insecurity force a set philosophy on guidance, giving it now a strong directive or again a developmental focus. Morse (22) warned that guidance and counseling, while focusing on the individual, should recognize that the individual exists in a social setting; a healthy balance must be maintained between the development of the individual and his preparation for group living. Lee (17) a cultural anthropologist, pointed out to guidance workers that the principle of respect for individual initiative, integrity, and personal autonomy can be reconciled with the principles of social limits, conformity, and law. According to Bordin (5) the assumption that within certain limits individuals should come to terms with society each in his own way provides the "foundation rationale" for personnel work and justifies the need for psychological counselors distinct from personnel workers who are simultaneously administrators of social policy. Strang (32) summarized various trends and foci in current guidance and pointed out the need of guidance workers to see the person in society and the reciprocal relation of society to the individual. This growing orientation toward what Murphy (23) called the cultural context of guidance is becoming more explicit with the emphasis appearing in the literature on such sociopsychological factors as interprofessional relations (5), social learning (25), and the recognition that guidance is concerned not merely with the individual but also with the cultural and social field whose forces must be understood and dealt with in guidance (19).

Influence of Fields of Psychology

Guidance, particularly in the area of counseling, has for some time felt the influence both of clinical psychology and of the psychology of learning and perception as is evidenced by several theoretical positions taken on the nature of the counseling process which appear in the literature (5, 7, 25, 27). While these influences have led some personnel workers to identify counseling with psychotherapy and to maintain a methodological distinction between guidance and counseling, there is some evidence that they are helping guidance in other areas besides counseling to move from a peripheral focus on technics and structure to a more centralist and substantive position. This appears to be taking place particularly in the area of vocational guidance where more precise theoretical formulations of vocational development and adjustment are beginning to appear.

Super's initial exposition (35) of a theory of vocational choice in which he stressed the dynamics of the long process of choice and adjustment has stimulated research on career patterns and personality factors in vocational choice (15, 20, 28, 31, 33, 38) which appears to be laying down a new direction for theory and research on the deeper psychological and philosophical factors which shape the vocational history of the individual. Bordin (5) noted the change from a focus on information and problem-solving toward a concern with attitudes, needs, and motives, and their relation to vocational choice.

Thompson (37) outlined some of the concepts underlying current vocational guidance and related them to certain underlying assumptions of American democracy. He maintained that as a profession vocational guidance should concern itself not merely with skills and technics but also with rationale, with the why as well as the what and the how. While guidance in general has not yet felt the impact of current theoretical models of personality to the same extent as has counseling, yet its current developmental focus may make it more receptive to this influence. Bordin (6) stated that student personnel work has passed from the stage of individual differences to the age of personality development with greater emphasis being placed on the emotional and motivational life of the individual. Super (36), in discussing the evolution of counseling psychology from its origin in vocational guidance, pointed out that clinical psychology has made vocational workers more aware of the unity of the personality and the overlapping of problems within the individual personality.

Summary

Guidance workers as judged by the recent literature have not been explicit in expressions of the philosophy underlying their work. At the same time they have not operated entirely without a philosophy. As a result of the climate in which it functions and under the influence of various fields of psychology and sociology there is some evidence of a movement toward more precise theoretical positions in areas of guidance other than counseling where the process seems to have taken place already. We may expect in the future to find this trend more amply reflected in the literature than it is at present.

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CHAPTER IV

The Role of the Teacher and the Instructor in the Guidance Program

HAROLD COTTINGHAM * and WALTER M. LIFTON

THE 1953 issue of the REVIEW devoted to guidance pointed out that there was a dearth of sound research dealing directly with the function of the classroom teacher as a participant in the total guidance activities of a school; the statement is still true. On the other hand, one finds an increasing number of informal studies which examine some phase of the teacher's responsibility in assisting pupils in or beyond a guidance setting. Some of these studies can be classified as research altho many are opinion, discussion, or a recounting of actual experiences in applying principles or technics. It is reasonable to conclude that interest in clarifying the teacher's guidance role is increasing altho further research continues to be needed.

Teachers as Guidance Workers— A Continuing Emphasis

Among association materials treating the place of the teacher in the guidance program were *Guidance in the Curriculum* (3) of the Association for Supervision and Curriculum Development and the Yearbook, *Guidance for Today's Children* (59), of the NEA Department of Elementary School Principals. A regional study, *Guidance in the Public Schools* (38), made by the Southern States Work Conference, contains a research section, "Guidance Needs of Elementary Teachers in the Southern Region."

Federal and state education agencies have also been active in compiling materials which included topics or references dealing with the teacher's guidance function. Examples include publications of the U. S. Office of Education (27), the Virginia State Board of Education (80), and the California State Department of Education (10).

Two texts on elementary-school guidance contained material outlining the classroom teacher's role; both Cottingham (14) and Bernard, James, and Zeran (6) devoted space to the subject. Many general guidance publications described the teacher's guidance function in one or more chapters: Books in this category included those by Ohlsen (61), McDaniel (52), Mathewson (55), Bennett (5), and Willey and Andrew (85). Other references, perhaps on the periphery of guidance, also gave greater emphasis to the teacher's responsibility as a guidance functionary. In this group was the 1955 *Yearbook of Education* containing a subsection by Strang (77) which discussed the teacher's guidance work. As examples of other books in the related disciplines of child guidance, child development, and educational psychology which touched, albeit superficially, on the classroom teacher's guidance functions, Driscoll (20), Jenkins and others (37), and Cronbach (16) were noted.

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* Assisted by Ulrey Wilson and Evelyn Jordan.

The Role of the Classroom Teacher in Guidance

Traditionally, attempts to improve the quality of the teacher's contribution to the guidance program have put primary emphasis on the need for more accurate information about pupils in order to improve teaching effectiveness. In view of this tradition it is noteworthy that many of the recent studies raised questions about the accuracy of the hypothesis. Hoyt (34), for example, tested the effect of teacher knowledge of a pupil's characteristics on the pupil's achievement. Using eighth-grade pupils, he established three conditions of teacher information: (a) where no systematic information was offered, (b) where results of standardized intelligence and achievement tests were provided, and (c) where test results and information on personal characteristics of pupils were given teachers. He found no significant difference in pupil achievement in mathematics and social studies as a result of the three treatment variables. In achievement in English he did find a significant difference in favor of providing teachers *no* information. Altho it might be unwise to generalize from these data, the study does support the growing emphasis in the literature that it is not technics which foster change, but rather the manner in which the teacher's personality enables him to utilize them.

Sociometric testing continues to be employed frequently in research. Support for its use, as in Admundson's study (1), tends to be due to the effect it has on the user. In his study, for example, Admundson found that teachers who participated in the project became more observing of interpersonal relationships within their groups, of leadership qualities, and of isolation and rejection. It is interesting to note that none of the studies found in the area mentioned the possible negative effect of the instrument on the subjects. None discussed how subjects were asked to focus their attention on their peers in terms of a hierarchical structure, rather than in terms of acceptance of individual differences. The several studies by Gronlund (29, 30, 31) pointed up the tendency for youngsters to be consistent in their choice of peers over a variety of situations, while their teachers, attempting to predict these choices, tended to differentiate between situations in an inaccurate fashion. Despite this basis for distortion, teachers tended to be able to predict the class's peer rankings at the 1-percent level of significance.

Gronlund's work also supported the findings of Bogen (8) who found that the teachers demonstrating the highest rapport with their classes were the ones who were most sensitive to the complex social structures within their classes. Dineen and Garry (19) put the value of sociometric information to a pragmatic test. By manipulating the seating of pupils to bring less chosen lower-class pupils next to upper-class members, they tried to increase social acceptance. They found that this manipulation of seating was not enough in itself to reverse attitudes altho it did seem to weaken them. Wandt and Ostreicher (82), testing samples of classroom behavior, found wide variations in social-emotional climate from one observation to another, and from one class to another.

The present emphasis on using art as a way of identifying insecure children runs into difficulty as indicated by Martin's research (54). He found that the characteristics which have been suggested as being expressive of feelings of security do not differentiate between the drawings of secure and insecure children.

Therapeutic Role of the Teacher

As the concepts of mental hygiene, counseling, and therapy become more popular, the responsibility of the classroom teacher in these areas becomes increasingly the focus of discussion. Lifton (46, 47) and Franklin (25) attempted to define the limits imposed on the classroom teacher by virtue of her training and responsibilities to the total class.

A novel concept was developed by Maxfield (56) when he described the new program at the University of Illinois designed to train librarians as counselors. In terms of their nonjudgmental role, availability, familiarity with resource materials, and desire to help youngsters, librarians present initially many of the requirements for effective counseling. Seeman (70) contributed a helpful summary of child therapy with attention primarily on work with younger children using play technics.

The Teacher in the Classroom

Considerable attention was given to the problem of clarifying the guidance functions of the classroom teacher. Gordon (26), Krugman (43), Kaback (39), Pearson and Sauer (64), and others stressed the significant influence of the teacher in knowing, accepting, and understanding pupils as well as in providing assistance in making decisions and releasing feelings. Other writers, such as Caskey (12) and Leonard (45), placed equal stress on another aspect of the teacher's role, that of cooperating with the total guidance program and using available facilities for augmenting their own direct helping skills.

Jackson (35) related academic growth of pupils to the use of guidance practices. He found that an increase in teacher-pupil contact thru such devices as homerooms or blocks of time does not necessarily provide better sociometric or personality integration in the classroom unless the teacher provides attention to these specific pupil needs.

Ojemann (62) demonstrated how present curriculum and textbooks reflect a noncausal approach to situations. They develop a tendency to deal with symptoms rather than with the behavior which prompted the symptoms. Reorganizing the class and texts significantly affected pupils' ability to perceive causal relationships and to be willing to assume responsibility.

Seeman and Edwards (71), and Siegel (73) found in their studies dealing with remedial reading problems that reading disability cases are not to be regarded as educational problems *per se*, but as emotionally disturbed children who require appropriate therapy. Given therapy, there are significant gains in reading. Strang (76) also related guidance and reading problems.

Using the classroom itself as the place to deal with concerns of youngsters, Rector (68) used role-playing by the children, with the teacher serving as a reflector of the feelings expressed, and judged the technic as helpful in student growth.

Both Fagin (22) and Tyler (79) studied the developing vocational interests of youngsters. Both emphasized the importance of the effect of the development of value systems early in life upon later vocational choice. Tyler, dealing with 10-year-old children, isolated four factors in boys and three in girls which appear to be operating. Her study suggested that patterned interests develop thru dislikes. Broad attitudes, such as those about one's sex, work and activity, and aggression, seemed to be of major importance. Sex differences were well established by this age. The introduction of vocational information into the elementary curriculum promises to offer real guidance help to the youngster.

Teachers have a growing responsibility for parent-teacher conferences. Walker (81) focused his attention on one of the most difficult problems in this area, the interpretation of low test scores to parents. He indicated the need for an honest presentation of the facts so that parents may be aware of realities.

In general the research reviewed suggested that teachers are increasingly asked to face and deal with the emotional problems of their pupils in the classroom. Individual counseling, because of its effect on classmates, appears to be considered best accomplished by referral.

A number of authors have written on the subject of applying the principles of mental hygiene to the classroom. Altho not synonymous with guidance functions nor labeled as such, these articles dealt with attempts to improve the adjustment status of pupils, one of the objectives of guidance. Bedoian (4), for example, completed a mental health analysis of selected sixth-grade pupils using the *Mental Health Analysis*. He found (a) that the underage and at-age pupils earned significantly better mental health scores than overage pupils, (b) that the socially overaccepted pupils made higher scores than the underaccepted pupils, and (c) that the four highest "stars of attraction" had significantly higher mental health scores than the rejects and remainder of the class. Other writers, including Newman (60), Wilson (86), Shacter (72), and Cribbin (15), attacked this problem at the discussion level. They seemed to agree that acceptance of the pupil, a permissive atmosphere, a friendly manner, and an awareness of symptoms indicating referral are important teacher responsibilities.

Some research has been conducted to determine the guidance value of subjectmatter areas. Fogler (23), experimenting with French as an emotional release medium, reported that 47 out of 202 Grade IV pupils who were shy and withdrawn became more responsive to parents, friends, and teachers as a result of his experimentation. Ream (67), using choice of musical channels with two 10-year-old children and a music class, produced satisfactory evidence of release of feelings and greater participation. The cathartic value of creative writing thru themes can be used successfully to work thru personal-social problems, according to Hall (32). In the area of social studies Cano (11) described a ninth-year unit, "The Individual as a Worker," which, supplemented by audio-visual aids and testing and analysis, formed the basis for further personal research on career planning.

Numerous articles contained opinion statements which suggested how teachers in various fields could use guidance in their instruction. Fontanella (24) outlined the role of the college military instructor as a guidance person. Loring (50) reported on a study which used group discussion in English as a means to improve the mental health of three classes. The class in chemistry can be used profitably for vocational guidance, according to Pugh (66). Ojemann (63) stated that human relations can be improved thru physical education instruction. Additional discussions which related guidance to specific subjects in the curriculum were presented by Arbuckle (2) for English, Thistlewaite (78) and Dame (17) for business education, Gregory (28) and Jaeger and Slocum (36) for physical education, Pruett (65) and Hamilton (33) for vocational agriculture, Lowry (51) for science, Davis (18) and Myers (58) for library, Lindberg (48) for industrial arts, Ricci and Lebus (69) for homemaking, Elliott (21) and Brown (9) for mathematics, Lindsay (49) for health education, and Land (44) for art.

Guidance and Curriculum

With the development of guidance from a "services" emphasis to the broader concept of guidance permeating the whole school, the relationship between guidance and the curriculum has come into question. In the past three years solutions have been brought to the fore by Kelley (40) and by the Association for Supervision and Curriculum Development (3). The point of view taken in both cases is that all classroom teaching is inseparable from guidance; some aspects of guidance, however, must be separated from instruction.

Bernard, James, and Zeran (6) pointed out that a curriculum constructed from a mental hygiene point of view makes the most of guidance. Mance (53) also suggested an emotional needs approach to curriculum improvement. Such suggestions seem to indicate that presentday schools are not combining guidance and curriculum sufficiently well. Strang (75) described curriculum and guidance as overlapping circles. There is an area common to both curriculum and guidance; each, however, has its *distinctive features*. The special curriculum area includes technical aspects of curriculum establishment and change; guidance makes its unique contribution in the individualized aspect of teaching and in the technical aspects of counseling and psychotherapy.

The Association for Supervision and Curriculum Development (3) suggested that when instructional goals become individualized, they become guidance goals. To Weitz (83) instruction has to do with the needs of society, while guidance is concerned with the needs of the individual; the latter viewpoint was also emphasized by Bixler (7) and Wellington (84). However, if the teacher is to fulfil his guidance role best, he must be trained for the job. This training should be centered on the emotional self-constructs of the child, according to some authorities (13, 41, 74). On the other hand, Kotinsky and Coleman (42) felt that the teacher's greatest contribution to the mental health of the child consists in training him in knowledge and skills so that he can cope with his environment; the inference is that subjectmatter training is also important. Morse (57) pointed to difficulties in integrating guidance and instruction at the college level.

One point of agreement is found in all the articles mentioned in this section. The individual is the focal point for guidance, curriculum, and the teacher; the fact sometimes seems to be forgotten in discussions about means of providing guidance services.

Summary

There can be little doubt about the growing interest and attention being paid to the role of the classroom teacher in guidance. In a sense the definitions of the teacher's function reflect the conflicting pressures operating on the schools today. Despite the confusion over the correctness of a mental hygiene vs. a therapeutic approach, the classroom as the vehicle for transmitting subjectmatter vs. subjectmatter as the means of meeting human needs, the importance of the teacher as a subjectmatter specialist vs. as a catalyst to learning—despite these and many other areas of disagreement, there emerge specific areas which are receiving primary attention and warrant additional research.

At this time there is need to develop technics to quantify and assess the dynamics of the group process in the classroom better. The effect of existing curriculums and texts on attitude formation and problem-solving should continue to receive major attention. Recognition of the early roots of attitudes and values in relation to the world of work must result in the development of more appropriate materials for elementary-school youngsters.

Due to increasing shortages in teaching staff, technics for training teachers merit maximum attention. Attention should be given to the therapeutic role of the teacher education institution in helping teachers perceive the relationship of their personality and needs to their classroom behavior.

Recognition of these and a host of other problems serves to indicate that we are finally on the verge of developing an area which has long received lip service, but which has obtained little scientific help in obtaining the answers needed to establish professional roles.

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CHAPTER V

The Counseling Process

WILLIAM COLEMAN

In reviewing studies of the counseling function in this issue, the writer chose to accept the rather broad definition used by Bordin and Wrenn (11) in Chapter IV of the April 1954 issue of this Review. The following headings will be used in considering these studies: Professional Developments, Theory Formulations, and Studies of the Counseling Process.

Professional Developments

In 1953, Division 17 of the American Psychological Association changed its name from Division of Counseling and Guidance to Division of Counseling Psychology. This event formally marked the establishment of counseling psychology as an area of specialization at the doctoral level in psychology (2). There remains much uncertainty as to the unique characteristics of this phenotype as compared, for example, with clinical psychology. However, from Adkins' factor analysis (1) and an interest pattern study by Comrey (15), it seems likely that counseling psychologists are more concerned with less seriously disturbed individuals and that they are interested more in quantitative aspects and measurement devices. They are also more likely to be responsive to group or institutional values when they conflict with the needs of individuals.

The majority of counselors are guidance workers prepared generally thru schools of education. The rapid growth of the American School Counselor Association Division of the American Personnel and Guidance Association attests to the size of this group. The preparation of school counselors has been under rather constant study by the National Association of Guidance Supervisors and Counselor Trainers and the Guidance Section of the U. S. Office of Education since 1946.

In the last few years a sizeable increment in funds available for vocational rehabilitation has led to considerable expansion of activity in rehabilitation counseling. New training programs have been initiated in a number of universities under the auspices of departments of education, psychology, social work, or guidance, or as joint efforts. A conference held in 1955 (25) outlined the competencies needed by rehabilitation counselors.

Increased emphasis has been placed on professional training for pastoral counseling. *Pastoral Psychology* and *Counseling* are two journals published especially for ministers interested in pastoral counseling.

Interest and concern with respect to the selection and evaluation of counselors has resulted in several research studies during the triennium. Cottle with various collaborators (16, 17, 18) published a series of reports of studies with an experimental attitude inventory intended to differentiate counselors from teachers. Item analyses yielded keys considered highly usable in the study of effects of counselor training and experience.

Brady (12) described the use of a group discussion method for selecting student counselors. Applicants in groups of four or five were asked to discuss a variety of typical residence hall situations which a student counselor might have to meet. Four observers usually watched the discussion.

A professional activity preference inventory was developed by Koile (31) to aid in identifying college teachers interested in faculty counseling. Statistical data available to date for the inventory seem encouraging.

Arbuckle (5) examined the relationship between scores on the *MMPI*, *Heston Personality Inventory*, and the *Kuder Personal Preference Record*, and the extent to which a student is desired as a counselor. The preferred counselor seems to possess the traits of tolerance, warmth, interest, patience, and sincerity.

Hopke (26) described an extension of Porter's test of counselor attitudes. Performance on the test was related to types of responses made in actual counseling, and fair reliability coefficients were obtained. It would seem to be a promising instrument for use in counselor training.

As the Sub-committee on Counselor Trainee Selection of the Division of Counseling Psychology (3) pointed out, there is considerable diversity in methods of counselor selection. The essentially negative results of the prediction study in clinical psychology reported by Kelly and Fiske (29) and the perennial problem of an adequate criterion are discouraging aspects of the problem of selection.

Theory Formulations

Among the theoretical issues receiving considerable attention in the last few years has been (a) the interrelationship of behavioral theory and counseling practice, (b) clinical vs. actuarial prediction, (c) some of the dimensions in the counseling process, and (d) the dynamics of occupational choice.

In a symposium presented at the 1953 meetings of the APA, Combs, Shaw, and Shoben discussed, from three different points of view, counseling as learning. Combs (14) used perceptual field theory in his approach pointing out several fundamental assumptions that are made. However, he left unanswered the question of how we learn to perceive what we do perceive. He expressed himself as favoring dependence upon personality theory instead of learning theory for furthering counseling.

Using as a mantle the term *interactive conceptualist*, Shaw (40) demonstrated his catholicism in utilizing concepts for inclusion in his conceptualization of learning theory for counseling. He discussed in some detail the concepts of resourcefulness anxiety, repression anxiety, and inhibitory deficit and their applications to counseling.

Shoben (41) described how the counselor in effect redirects the learning of the client, for example, thru dealing with distorted expectancies and nonintegrative social behaviors. The counselor provides a learning situation in which the client is encouraged to re-examine his distorted cognitions. As these new learnings become associated with the security responses elicited by the counseling relationship, the client loses his anxiety reaction. Having acquired a new repertoire of "learning sets" in the counseling situation, the client now applies these in situations outside the clinical setting.

At the 1955 APA meetings, the case of a preadolescent boy was presented via a film to O. G. Mowrer, Gregory Kimble, Carl Rogers, and J. G. Miller. They were asked to discuss the case from the different learning theory approaches which they espouse, thus exhibiting some of the interrelationships of behavioral theory and clinical practice. Their comments were published with an introduction by Shoben (42).

Probably the most ambitious attempt at relating counseling to learning theory was incorporated in the book by Pepinsky and Pepinsky (35) in which they outlined a theory of counseling derived from Hullian learning principles. They leaned only slightly on psychoanalytic concepts and addressed their thinking toward the behaviors and problems encountered with normal clients as seen in guidance and counseling. Emphasis was placed on learning theory, and liberal use was made of Hullian concepts. Tho the Pepinskys emphasize that their constructs are first approximations, they are to be commended for the relatively rigorous approach they have taken to theory construction in an area of psychology noted more for faith and empirical opportunism.

Rotter's *Social Learning and Clinical Psychology* (39) presented another theoretical network for guiding thinking in clinical practice. Rotter drew from the concepts of Kurt Lewin as well as from neobehaviorism.

Meehl led two symposiums dealing with the question of clinical vs. statistical prediction. One held during the 1956 ACPA meeting was published (34), and the other is scheduled for publication. Meehl also reviewed studies in this area in his provocative volume (33) published in 1954. Evidence accumulated to date seems to favor the actuarial approach altho Meehl is careful to point out that studies to date have not been too conclusive. It would seem likely that many things that counselors are attempting to assess and predict thru clinical intuition may be accomplished best by actuarial tools, but there will remain for some time important behavioral domains for which a clinical approach will be needed. As Meehl puts it, the clinician will be needed for "classifying certain idiographic instantualizations of a nomothetic law."

In a book published in 1955, Bordin (10) stressed the dimensions of the counseling process, namely, cognitive, conative, and an ambiguity dimension. For Bordin, counseling was an interaction process intended to contribute positively to the client's personality development. In introducing the concept of ambiguity as a therapeutic variable, Bordin (8) suggested that this concept may also help to differentiate counseling from psychotherapy. He indicated that there should be less ambiguity in counseling than in psychotherapy as the counselor will be more likely to focus his reactions in order "to help the client restrict self-exploration and self-expression to those areas of emotion and motivation which are specific to a given problem situation, e.g. making a vocational decision."

McArthur (32) provided a stimulating analysis of how the clinician arrives at a diagnosis. The more effective counselor seems to make use of an eclectic approach, thus looking for the "interpretation of any single datum that would produce congruence with all the other data and hypotheses." Koester's doctoral dissertation, summarized in *Educational and Psychological Measurement* (30), was also quoted by McArthur as supporting his contention that the more adept counselor is not wed to a single theory.

After Ginzberg and his collaborators (23) published their theory of occupational choice in 1951, there was much activity in this area. Several papers were published, but probably the leading research in this field is being done under the direction of Super (45) in the Career Pattern Study. Since the study is still in process, no conclusions can be drawn at this time.

A report (7) was issued on a seminar on occupational choice, sponsored by the Social Science Research Council, in which a conceptual scheme was advanced for construction of a theory of occupational choice and selection. With an interdisciplinary group, the economic, psychological, and sociological aspects of job choice were considered.

A revision of an earlier monograph by Darley appeared as *Vocational Interest Measurement: Theory and Practice* by Darley and Hagenah (21).

Roe (36, 37) proposed a new classification of occupations using two axes: primary focus of activity in the occupation and level of responsibility and skill of performance. Her classification is designed to bridge some of the gap between occupational choice and personality theory.

It may be seen from the papers reviewed above that there has been much activity in examining the theoretical foundations for counseling. However, the theoretical framework that has been spun so far seems to lack a firm foundation.

Studies of the Counseling Process

Danskin (19) reported on studies conducted at Ohio State concerning the subroles played by counselors. Examples of such subroles are participating, reflecting, information giving, asking for elaboration, and advising. The subrole assumed by the counselor was associated with the type of problem being discussed. The analysis of typescripts from five university counseling centers suggested that counselors tend to have favorite subroles which they exercise more frequently than others. There is some evidence, altho it is not clear-cut, that the subroles assumed by counselors may be related to the particular counseling center in which they are working. The last finding would seem logical if it is true that the kinds of problems most frequently handled at the different counseling centers vary.

Utilizing the same typescripts mentioned above, Danskin and Robinson (20) reported that experienced counselors fell in a continuum with respect to degree of lead, not in dichotomous groups as the names "directive" and "nondirective" suggest. Altho the degree of lead varied somewhat for different clients for a given counselor, the counselors tended to maintain their relative position in the group of counselors studied with respect to degree of leading.

Dipboye (22) showed that counselors tend to vary their styles from one topical unit of discussion to another. They also tend to use similar styles for a given unit. However, two of the six counselors he studied deviated somewhat from the remaining four, showing less flexibility. A further analysis indicated that the two were more inclined to respond the same way on cognitive units as on affective units whereas the others showed a greater contrast.

Strupp (43, 44) submitted 27 patients' statements to eight Rogerian and seven non-Rogerian psychologists, asking them to respond to these statements. Sharp differences in the responses of the two groups were elicited tho the more experienced Rogerians and those who had been analyzed showed fewer passive acceptance and reflective responses (characteristic of Rogerians).

Coburn (13) obtained significant differences in the reactions of clients with different needs to the same counseling technic. Significant differences were also obtained "in the reactions of clients of the same needs to different technics of counseling. The three modes of counselor behavior were categorized as (a) relationship-centered, paternalistic, counselor-directed; (b) relationship-centered, equalitarian, client-directed; and (c) problem-centered, equalitarian, counselor-directed."

Hoyt (28), utilizing a 2 x 2 x 4 factorial design involving two counseling methods (eclectic and Rogerian), two types of problems (vocational planning and social relations), and four counselors, obtained somewhat contradictory results. He concluded that for most criterion variables, "the nature of the client's problems, the counseling method employed, the particular counselor involved, or any combination of these three factors made little difference in terms of the degree to which the hypothesized outcomes were attained." He found that vocational clients expressed more satisfaction with themselves after counseling than did the social relations clients. Eclectic counseling seemed more effective than Rogerian counseling in reducing the severity of specific problems.

Perhaps the conflicting findings from the five studies cited above may be attributed to differences in the representativeness of counselors and methods used, and criteria employed.

In a novel study, Anderson (4) used one subject to investigate the relationship of physiological and verbal behavior during client-centered counseling. His data suggested that there was a correlation between emotional (as indicated by *EKG* measures of heart rate and variations thereof) and cognitive behavior.

In discussing the actuarial point of view in counseling, Horst (27) pointed out that the counselor must know how all the variables which he is using to describe people are related to desirable behaviors in the different educational or vocational activities in which the client might engage.

Studies evaluating the relative effectiveness of various ways of interpreting test results to clients date back at least a decade with the usual criterion being increase in self-understanding. During the last three years, Berdie (6) and Rogers (38) made such studies. Relatively little difference has been found among the various methods of test interpretation with respect to the criterion. The need of clients to have favorable self-concepts, the strangeness of test "lingo," and the brevity of time for test interpretation probably all militate against obtaining significant results indicating any one method as being superior to the others.

Summary

Examination of the work reported in this chapter indicates that substantial progress is being made along the fronts discussed here. Knowledge about personality development and the dimensions of the counseling process is increasing, and implications for counseling are being investigated. As Super (46), Bordin (9), and Hahn and MacLean (24) as well as others have indicated, today's counselor considers closely the emotional dimension even when dealing with clients having presumably only educational or vocational adjustment problems. Research is also being conducted to answer more definitely the provocative questions Meehl has raised.

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CHAPTER VI

Vocational Guidance

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DURING the period under review, vocational guidance gained in stature thru endorsements by nationally prominent groups (32, 41, 42) and thru research (8, 12, 16, 22, 31, 34). The need for vocational guidance was also apparent from a survey by Shosteck (65), and another by Grunes (26). On the other hand, Froehlich (20) pointed up the importance of continued research which would assess the effects of vocational guidance. Unfortunately there remained confusion as to whether a person's expressed need for vocational guidance was merely symptomatic of a deeper maladjustment or whether vocational guidance could help a person to higher levels of adjustment. During the past three years, research provided few answers to the dilemma. Grant (24, 25) found that pupils would seek the school counselor's assistance with educational and vocational problems more often than with personal-emotional problems. He concluded that such attitudes should be changed. On the other hand, Super's (84) presentation of a counseling case implied that vocational counseling in its own right might further total adjustment.

A Rationale for Vocational Guidance

In the professional literature, a rationale for vocational guidance continued as an important discussion topic. Probably the most thought-provoking concept was the rationale and design for the "career pattern" research of Super (82). Some other ideas regarding the nature of vocational guidance were contributed by Sanderson (61). Beginning with a series of counseling activities and counselor-client interrelationships, Samler (60) developed a series of postulates which he felt undergirded vocational choice in counseling. Other fruitful hypotheses were those of Thompson (87) on concepts basic to vocational guidance and those of Beilin (1) who suggested that the principles of vocational development were but special cases of general developmental theory. Using various indexes of physical and other kinds of growth in relation to interests, Hulslander (29) found relationships which gave credence to Beilin's theory. Meadow (38) reviewed previous formulations of vocational choice theory and research and made several suggestions regarding future research methodology and design.

Sternberg's study of interests (77) and the over-all adjustment of normal college students hinted that total adjustment and interests may have relationships worthy of further exploration. While Segal (63) and Teevan (85) found relationships between personality factors and vocational choice and fields of specialization, Berg (6), in a review of research relative to personality structure and occupational choice, developed the theory that definite personality characteristics may be more related to choices within a broad professional field than to choices between two or more professional fields. Fine (18) hinted at the same concept in his discussion of job-worker situations as "behavior situations akin to other of life's behavior situations but having their own peculiar conditions." Altho some of those contributions cannot be construed as research, they did suggest hypotheses as well as ideas regarding designs and methodology.

Role of the Vocational Counselor

With respect to roles, the state of counselor confusion was revealed by Hitchcock (27) who found in a nationwide survey that 40 percent of the high-school counselors did not feel that assisting high-school pupils with vocational plans was part of their job.

In times of personnel shortages the vocational counselor has had to contend with various types of recruitment practices. The identification of gifted children in Los Angeles Schools (33) who were interested in science and engineering served as a pilot study of one possible role of the school in recruitment. Unfortunately the study offered little in the way of evaluative research. A discouraging note was sounded by Speer (75) who found that more than 90 percent of those giving vocational guidance to pre-engineering students were not actually professional counselors or trained in giving occupational information. The recruitment possibilities of such practices were unlimited. It must be added that these practices were not confined to the field of engineering. Certainly recruitment vs. counseling and the concomitant effects upon students is a ripe research plum.

The concept of success, as presented by Olshansky (46), raises ethical and operational questions. According to Fine (18), counselor responsibilities in the use of occupational information are great, some of his hypotheses being worthy of further research. Substantially the same conclusion was reached when Olshansky (47) reviewed research on the labor market and the counselor's role in helping bring together workers and jobs.

Vocational Planning and Adjustment

Past research indicated that some expressions of adolescent interests change as students mature, so it was no surprise that Tutton (88) found approximately 45 percent of the rankings on the *Kuder Preference Record, Vocational,* were unstable over a three-year period. Using the same measure of interests, Rosenberg (57) obtained test-retest r's ranging from .47 to .75 for the several scales. Studying the consistency of choice during high school and employment after high school, Schmidt and Rothney (62) concluded that there was sufficient variability to question rigid course sequences based upon expressed vocational choices. As a result of his research, Porter (51) proposed a refinement in studying occupational choices. He placed the emphasis upon a vocational *plan* rather than a *choice*, asking pupils to give a step-by-step plan as to how they expected to reach their goals. This procedure appeared to produce more stable results than the usual choice questions.

Two classical summaries of research were Darley and Hagenah's *Vocational Interest Measurement* (14) and Strong's *Vocational Interests 18 Years after College* (81). Altho these publications were concerned with interest measurement, they contributed insights into vocational planning and adjustment. Darley and Hagenah critically reviewed theory and research on the origin and development of interests. Strong reviewed research and suggested research ideas regarding vocational adjustment.

An increasing amount of effort went into the study of pupils' self perceptions and how they were affected by testing and/or counseling; positive effects were noted in some of the research. Some of the studies (5, 21, 31, 67) were controlled rather well considering the phenomena under study, but the exact methods of test interpretations were left unexplained to the consumer of research. The discussion of percentiles and other technical concepts left the reader wondering to what extent test results were interpreted in meaningful words and whether pupils were permitted to relate test results to their experiences, including projected activity. A related study by Young (92), who examined self-estimates of scholastic promise by college freshmen, indicated that freshmen could predict their potentiality as well as or better than could counselor estimates, high-school rank, or ability tests. Matteson (37) also found that college freshmen could predict their scholastic achievement with some accuracy. Another facet of the general problem area, that is, interest changes with added experiences at the college level, was reported by Matteson (36); changes were significant, particularly in the case of majors in agriculture, home economics, and engineering.

A sudden spurt was evident in research relative to job values such as prestige, security, economic gain, or conditions of work. Singer and Stefflre (68) found statistically significant sex differences for adolescents as well as significant differences between adult males and adolescent males (66). However, according to Miller (39), another population of college men did not show significant differences between age levels. At the college level, Dickinson (15) found that job values seemed to be associated with some majors pursued by male seniors. Research of Beilin (2), and Beilin and Bergin (3), indicated that social mobility, a possible job value, varies with level of education, sex, and type of educational preparation.

Using questionnaires sent to women college graduates, Chervenik (10, 11) found about one-third of the class married and many of them using their college training in one way or another. These studies highlighted the need for more research regarding marriage-career patterns for women.

Reviews of research on the subject of job satisfaction were continued by Robinson (52, 53, 54) and seemed to show significant trends. First, there was a tendency toward probing into total life adjustment, and questioning whether job satisfaction could be considered as an independent variable. And second, it began to be recognized that before anyone could settle basic issues of job satisfaction, it was necessary to test the validity of the measures used.

Understanding Occupational Patterns

Occupational classification plans provide ways of comprehending relationships among occupations. One of the major contributions to classification during the past three years was a two-dimensional plan described by Roe in an article (55) and finally, after modifications on the basis of research by Moser, Dubin, and Shelsky (40), in her volume, *The Psychology of Occupations* (56). First, occupations were classified into eight primary groups according to the focus of activity, for example, service, business contacts, and the like. Second, each primary group was divided vertically into six groups according to degree of personal autonomy and the level of skill and training required. Roe devised a classification system and also brought together pertinent research which clarified the groupings and described workers within each group. There were sufficient hypotheses in Roe's book to keep research workers busy for at least a generation. Combining what was known about the psychology, economics, and sociology of occupations, Thomas (86) also added to our knowledge of the relationships and classifications of occupations.

Research on another two-dimensional classification plan by the U. S. Employment Service was continued and described by Fine (17). The classification plan assumed that a worker functioned at varying levels with three hierarchies: things, data, and people. By rating worker traits from job analyses, the U. S. Employment Service published *Estimates of Worker Trait Requirements for 4000 Jobs* (89). Like the *Revised Minnesota Occupational Rating Scales* (48), which were based upon ratings of selected psychologists, the U. S. Employment Service ratings require extreme care in their application by vocational counselors. Again they opened new doors for research, for example, the validity study of the *MORS* by Geist (23).

A number of research projects dealt with workers in specific occupations. The following contributions had some degree of uniqueness: Ross, Hunt, and Jackson (58) studied the abilities of mechanical engineers; Patterson (49) compared *KPR* scores for bakers and for students in baking courses; Bennett, Seashore, and Wesman (4) reported *DAT* results for 17 broad occupational fields; Super (83) published the diary of a psychologist; Jacobs and Traxler (30) examined *KPR* scores for satisfied and dissatisfied public accountants; Bookbinder (7) surveyed former major league baseball players; Zapoleon (93) synthesized research regarding the working girl; Wolfle (90) took a census of America's specialized talent; and Shaffer and Kuder (64) compared interest patterns for physicians, lawyers, and businessmen.

The vast reservoir of research emanating from occupational sociology was reflected in Caplow's excellent volume, *The Sociology of Work* (9), which brought together research portraying the sociologist's concepts of occupational life patterns. Such research was further emphasized by Smigel (74) who found 177 occupational and related articles from 1946 to 1952 in four major American journals of sociology.

Utilizing the *NVGA Standards for Occupational Literature* (45), the NVGA Guidance Information Review Service developed a new aid, the *NVGA Bibliography of Current Occupational Literature* (44). This publication reviewed 500 titles out of the thousands submitted by publishers. Additional reviews were a regular feature of the *Vocational Guidance Quarterly* (43, 50). The procedure contrasted with Forrester's listing (19) of materials from all publishers. Since Splaver (76) found that ninth- and twelfth-graders seek in occupational books most of the criteria suggested by the NVGA, perhaps the need has now been established for testing thru research the validity of the NVGA standards for occupational literature.

Use of Occupational Information

Sinick (69) compiled existing opinions regarding the use of occupational information in counseling interviews. His review emphasized the many hypotheses yet untested. Several hypotheses were also suggested by Rusalem (59) who felt that occupational information had greater meaning when it was related to the affective life of the counselee.

Occupation courses or career days continued to supply individuals with many types of educational and occupational information. Reviewing various types of surveys, Sinick and Hoppock (72) brought together current opinion regarding the need for group presentations of occupational information. In another review, Sinick and Hoppock (70) reviewed research and raised pertinent questions which could be used for developing research hypotheses. Several other surveys on classroom group procedures, such as those by Sinick and Hoppock (71, 73), Hoppock and Stevens (28), Stevens and Hoppock (79, 80), and Wright (91), covered the teaching of occupations at the high-school and college levels. One evaluative study by Lowenstein and Hoppock (35), using experimental and control groups to test the value of a high-school occupations course in college adjustment, found significant differences favoring pupils who were enrolled in the occupations course. Another controlled experiment by Cuony and Hoppock (13) indicated that a job finding and job orientation course plus counseling resulted in greater job satisfaction and higher income than did counseling alone.

Summary

It was the intent of this review to present both research and some sources of research hypotheses. It is encouraging to see the interest shown in trying to establish a rationale for vocational guidance. Encouraging, too, is the fact that this interest was evidenced not only by individuals within the profession of vocational counselors, but also by individuals from economics, psychology, and sociology. This cross-fertilization of ideas from several disciplines has begun to clarify some of the basic issues involved in vocational guidance.

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CHAPTER VII

Group Guidance and Group Therapy

MITCHELL DREESE

No one familiar with counseling and guidance theory and practice would contend that group guidance and group therapy will eliminate the need for individual counseling and individual therapy. As Bennett (2) pointed out: "Years of trial-and-error methods and some sound experimentation and research have indicated that group and individual procedures in guidance are complementary aspects of a sound guidance program. Neither can fully take the place of the other, but each implements and supplements the other, rendering it more effective."

Hoyt (20) conducted a carefully controlled experiment at the University of Minnesota to determine the relative effectiveness of group and individual vocational guidance programs. He concluded that vocational guidance by either the individual or the group method was effective in producing positive changes on relevant criteria and that there was no difference in effectiveness between the two methods. The group technic used consisted of an initial orientation lecture followed by discussion in groups of five to seven students with counselors as group leaders. Faries (15) at the College of the City of New York conducted an investigation of two equated groups, one of which had only the regular orientation course, while the other, an experimental group, had such a course plus individual counseling. A follow-up study disclosed that 77 percent of the experimental group were graduated as compared with 51 percent of the control group, the difference being significant at the .001 level. Since the experimental group had volunteered for the counseling service, the selective factor confuses the results. Malloy and Graham (29) described a plan in operation at Marquette University by which freshmen met in a single session in groups of about 20, to discuss the pending testing program and the counseling services to follow. The writers concluded that such an approach saves time, reveals to the student that his problems are not unique, and paves the way for effective individual counseling.

In this chapter, group guidance is interpreted as those guidance processes conducted in groups and designed to assist "normal" individuals to analyze problems of choice and adjustment which confront them and to work out constructive solutions based upon adequate knowledge of self and knowledge of the areas in which choices and adjustments must be made. Group therapy is construed as group methods employed to assist individuals who present maladjustment problems in personality and interpersonal relationships which call for corrective and remedial action. These pragmatic definitions may or may not meet with general acceptance, but as Lifton (26) pointed out three years ago (and the situation is still unchanged), terminology in this field has not yet been defined clearly and the writer of necessity must adopt a frame of reference in regard to the scope of materials to be reviewed. Excluded from review is the wide variety of publications pertaining to group therapy in mental hospitals and other noneducational institutions.

Group Guidance for Parents

Since a guidance program can be maximally effective only if the cooperation and understanding of the parents can be obtained, a number of investigations have been conducted in this area. Kagan (23) reported on 33 group guidance courses for 1297 parents, sponsored by various parent-teacher associations, community centers, and adult education centers and conducted by the Federation Employment Service of New York and B'nai B'rith. The eight-week courses met once a week for two hours and were designed to give the parents a better understanding of how vocational choices come about. A questionnaire follow-up revealed that 71 percent of the parents felt they were helped in assisting their children make vocational plans and that they had much more confidence in dealing with such problems. Kagan concluded that individual counseling could not have achieved many of the benefits which the group course did such as the sharing of experiences, group interaction, and attitude changes accomplished in a dynamic group-learning situation. The *New York Times* (31) presented an account of a less intensive approach, conducted by the Family Service of Scarsdale, to help parents to understand more clearly the family's role in steering toward a career. Four counselors met with the parents and served as resource people in arriving at conclusions as to what should be the function of parents in helping youth plan their careers.

Cuony (10) found that parents lacked, but desired, the information and guidance their children were receiving in precollege group guidance at the Geneva High School, Geneva, New York, and organized three evening sessions for parents. The program met with such popular approval that it became a permanent part of the school's guidance program. Buchmueller, Porter, and Gildea (4), under the auspices of the St. Louis Council for Parent Education, undertook a group therapy project with 50 mothers of behavior problem children in public elementary schools. The experiment continued for two years with the parents meeting weekly in small groups with the therapist, who was a psychiatric social worker. Eighty percent of the children whose mothers attended the group sessions showed improvement in behavior as contrasted with 80 percent of the children of 48 nonparticipating parents of problem children who failed to improve. Parle (32) reported a somewhat similar approach with parents of problem children in two St. Louis Public Schools. She stated that parents benefited from the opportunity to express hostile feelings as well as from the resultant group interaction and socialization.

Guidance Courses

Jones and Miller (21), in a survey of the national picture of pupil personnel and guidance services in 1953, established the fact that approximately 92,000 secondary-school students were enrolled in "group guidance classes" in addition to the 158,000 taking courses in occupations and the 115,000 participating in group orientation activities. They concluded that bringing students together in groups to discuss their own problems has been found to have definite therapeutic value for individual students and, when properly conducted, is of material help in assisting them to solve their own problems.

Cuony and Hoppock (11) took two equated groups of 35 students each who did not plan to go to college and provided for the experimental group a course of instruction on matters pertaining to employment opportunities, "job-getting," and factors related to making good on the job. A follow-up one year after graduation showed a significant difference in job satisfaction between the two groups; and the experimental group, which had less unemployment, had earned $7719 more than the control group. The authors mentioned that the members of the experimental group requested and received more individual counseling. This may possibly have affected the results.

Lowenstein and Hoppock (27) conducted a study to appraise the value of a high-school occupations course in terms of students' success during the first year in college. A follow-up study of the control and experimental groups revealed that the 33 students in the experimental group made significantly higher grades with less time spent in study, devoted more time to extracurriculum activities, and were more inclined to make independent vocational choices. Despite the limited sampling, these results are quite significant and suggest the need for more comprehensive similar studies.

The long-range effects of the Flint, Michigan, guidance project were studied and reported by Cantoni (5). A follow-up of 121 experimental and 100 control group subjects showed that the experimental group had made greater gains in emotional adjustment, educational level achieved, and cultural and occupational status. However, there was no significant difference in economic level between the two groups. Sageser (37) reported a pilot study of group vocational guidance for use in small high schools. This project, conducted by a social science teacher as a unit of study in modern vocations, was rated favorably by the students who recommended that it come earlier than the senior year.

Student personnel work in higher education is beginning to pay more attention to training student leaders thru appropriate group experiences to be more skilful in the technics of group discussion and democratic leadership. Shaffer (39) reported an analysis of how a competent counselor can contribute to the training of campus student leaders by exemplifying in his committee contacts with students good democratic counseling procedure which may have a wide carry-over. Lancaster (25) conducted a survey of personal adjustment courses in California junior colleges and found that two-thirds of the schools offered a course in the psychology of personal and social adjustment. It was the consensus that these classes provided essential background information for the students and paved the way for effective individual counseling as needed.

Career Conferences

The public schools of Detroit, Michigan, in cooperation with the Institute for Economic Education developed an ambitious career exhibit, reported by Crosby (8), which made it possible for 50,000 high-school students, during a period of two weeks, to visit 60 exhibits of varied occupations, all under one roof. The program included special sessions for teachers and parents as well as for students. The visual displays were supplemented by mock employment interviews and contacts with representatives of business and industry. Student reactions were most favorable.

Rubinfeld (36) presented an account of a series of weekly group conferences on careers as a substitute for career day. Among the advantages reported were the following: (a) Speakers can be more advantageously chosen and scheduled; (b) there is more opportunity to cater to the interests of small groups; (c) there is more opportunity for leisurely discussion; and (d) student attendance is better when the conferences are announced by teachers of subjects related to the career field. Harlow (18) described "A Group Guidance Inter-Faith Project" between the Jewish Vocational Service of Chicago and the Erie Neighborhood House which centered around the development of a program of career nights for teen-agers. The experiment demonstrated that people with very different ethnic backgrounds can work together in a guidance setting to the advantage of both groups as well as to the young people to be served.

Group Guidance for College

High-school seniors who plan to go to college are aware of many things they need to know in order to make intelligent plans for the next year. Cuony (9) capitalized upon this interest and developed in close cooperation with the students a list of topics which they wanted to discuss in a series of group meetings. Admissions personnel, students from nearby colleges, and alumni attending college acted as consultants. Voluntary attendance on a large scale and informal evaluations by participating students indicated that the program was meeting a felt need. Cuony recommended that such a group program be supplemented by individual counseling as necessary. A novel approach to college guidance was reported by McCracken, Wharton, and Graff (28) which involved having high-school juniors actually spend five and one-half days on the campus of Allegheny College participating in a "clinic." The program included a comprehensive battery of tests, class visits, group conferences, and individual counseling. Those who qualified were encouraged to apply for matriculation to college at the end of the junior year. Altho the program has been in effect for 20 years, no quantitative data were provided as to how well such accelerated students succeed in college. Harris (19) made use of four group guidance approaches in helping preparatory-school students prepare for college: an "Educational Forum" for students and parents, a quarterly "Parents' Forum," a career day program, and a pre-induction military guidance series. The program prepared the way for effective individual counseling and developed effective teamwork between students, faculty, and parents.

Group Guidance thru Regular School Subjects

Guidance workers realize that valuable group guidance may take place as an important byproduct of instruction in academic subjects. Josephs (22) and Radner (34) explored the possibility of vitalizing the teaching of high-school English by having the students investigate, discuss, and write reports on vocational and personal problems. He concluded that such projects motivated the study of English and made a direct contribution to students in facilitating self-understanding and future planning. Koile (24) termed group guidance "a fringe activity" and postulated that if regular subjectmatter teachers were qualified to conduct group guidance as part of the instructional process, there would be less need for school guidance workers to assume such responsibilities. The 1955 Yearbook of the Association for Supervision and Curriculum Development (1) presented "the rationale for conceiving the whole teaching-learning process as inextricably related to guidance, and the teacher as the central figure in developmental guidance." It was recognized, however, that there is a place for the professionally trained counselor and that many teachers are in need of more effective training before they can discharge their guidance responsibilities.

Other Group Guidance Approaches

Tarbet (42) surveyed promising approaches to guidance by means of television and reported programs offered thruout the country. Topics covered almost the entire range of problems usually discussed in group guidance activities. Smith (40) described a program of school camping groups in operation in approximately 100 school districts in Michigan and concluded that the informal atmosphere of a camp provides an ideal psychological atmosphere for discussion of personal problems in a group setting. Morgan (30), in cooperation with the Carnegie Institute of Technology, undertook to determine the reactions of high-school seniors to a mailed "guidance" report of their performance on the *College Guidance Tests*. The majority said the tests were helpful, but about half of the students said they were discouraged. The study revealed possible values to be derived from such guidance by mail but certainly raised many questions concerning the inherent pitfalls of divulging test data without an opportunity for interpretation and clarification during a personal interview.

Group Dynamics

The borderline between group therapeutic technics and group guidance activities is admittedly a hazy one. What differentiates between the two is not the methodology employed, but the composition of the group and the objectives to be attained. Fine and Zimet (16) constructed an instrument designed to measure the degree and quality of participation in group discussion and to reflect degrees of interpersonal reaction and self-understanding. Trained raters, using a 12-point scale, were in high agreement immediately after observing and rating the performance of individuals in "group therapy-like seminars" and three months later, after hearing an electronic recording, were still in substantial agreement. Apparently the scale has high reliability, but its validity has yet to be established.

Driver (12) presented a detailed analysis of the conditions under which multiple counseling may be effective, based on experimentation with 15 small counseling groups involving 121 subjects. Approximately 80 percent of the subjects showed improvement in behavior and personal growth.

Scheidlinger (38) addressed himself to the problem of whether or not teachers should be group therapists. Using group psychodynamic methods, he examined the role of teachers and concluded that the primary function of the teacher is to utilize sound mental hygiene concepts in effecting constructive changes in behavior and attitudes thru the skilful utilization of group dynamics. He postulated that therapy attempts to heal; education, to enhance growth. He stated that group therapy places carefully selected individuals with diagnosed personality disturbances in a limited group for the primary purpose of repairing personality pathology and that this is a function for a skilled psychotherapist. Eiserer (13) analyzed the nature of group psychotherapy and concluded that its goals are the same as those of individual therapy. He concluded that a dynamic group situation provides certain advantages over individual psychotherapy.

Walter (43) experimented with the use of a tape recorder in connection with children's discussion of problem situations involving ethical and spiritual values. He concluded that the recorder was an excellent motivating device and provided a later record for study by the counselor and parents. Stripling (41) demonstrated the value of role playing as a technic to help graduate students in the field of guidance increase their competence in human relations.

Phillips and D'Amico (33) investigated the effects of cooperation and competition on the cohesiveness of small face-to-face groups in a problem-solving situation. Three of the four groups which worked under cooperative conditions increased in cohesiveness, but groups which worked under competitive conditions did not necessarily decrease in cohesiveness.

Group Psychotherapy

Coffman and Backus (6) studied the effects of group psychotherapy on a small group of preschool children with cerebral palsy and on their parents as well. The investigation suggested that group sessions which satisfied emotional needs, such as acceptance, understanding, personal achievement, and group interaction, helped develop the children's motor skills and produced speech improvement. The parents likewise profited from group therapeutic sessions which alleviated feelings of guilt and produced a better understanding of their children.

Group therapy was also used with a small group of retarded readers in a study reported by Fisher (17). The experimental group which participated in group therapeutic sessions for one hour a week for six months, in addition to receiving remedial reading instruction, showed on a standard reading test an improvement which was greater by 3.25 months than that of the control group which had only remedial reading instruction; however, the small sampling, 12 subjects, does not warrant definite conclusions. Crawford (7) described a program of group therapy for seven mentally disturbed boys in a school situation who, under the permissive supervision of the school psychologist, spent two hours a week in activities of their own free choice. Apparently, over a period of many weeks, the group developed more cohesiveness and its members learned to accept each other more readily. Robinson (35) experimented with group therapeutic sessions for 18 students in a girls continuation high school. The group met one hour a week for a semester and discussed personal problems confronting members of the group. The group seemed to enjoy the sessions and to profit from the experience. No objective data concerning the value of the sessions were presented. Falick, Rubenstein, and Levitt (14) reported on the results of a psychotherapeutic club for seven emotionally disturbed boys in a Michigan public school. The therapist was completely permissive and did not, for example, prevent the boys from taking a cat they had caught and using it as a soccer ball until it was dead. Of the four boys followed up, two were incarcerated, one was an anxiety-ridden homosexual, and one was increasingly masochistic. The investigators reported that the experiment provided valuable insight for the therapist.

The group therapeutic approach has been used not only with school children, but also with adults in an educational setting. Berman (3) organized 10 groups of 10 to 15 educators each who met weekly in two-hour sessions for 12 to 15 weeks. Group members described situations and incidents from their daily work which had emotionally upset them and under the direction of the therapist proceeded to analyze the likely causes of such emotional behavior. Most group members reported that they gained self-understanding thru the group sessions and were better prepared to cope with adjustment problems on the job. Warkentin (44) conducted a somewhat similar study with a group of elementary-school teachers who met one hour each week for two years. Attendance was voluntary, but most of the teachers came consistently to every meeting. Initially, most of the discussion centered around pupils' problems, but increasingly the teachers discussed their own attitudes and feelings toward their work and themselves. At the close of the course and after a follow-up two years later, the teachers felt that it had been a profitable experience.

Wieder (45) reported an experiment in which the conventional method of teaching psychology was compared with group therapy teaching methods with respect to the degree to which they modified attitudes of prejudice. The group taught largely by means of psychodramatic and sociodramatic methods showed more improvement on prejudice scores. They also developed a more positive self-concept and increased self-acceptance.

Summary

During the past three years, convincing research on group guidance and group therapy in educational institutions has been sparse. This is surprising in view of the current widespread interest and activity in group therapy in psychiatric circles in mental institutions and hospitals. If we accept the point of view that group therapy is a group method employed to assist individuals who present problems of maladjustment in personality and interpersonal relationship which call for corrective and remedial action, it is apparent that this area is not the exclusive domain of the psychiatrist and the clinical psychologist. School counselors, school psychologists, and many teachers should be qualified on the basis of training and experience to deal in a group setting with lesser personality problems and problems of social adjustment.

With the rapid increase in the school population which is now looming, and the current teacher shortage, student personnel and guidance workers will be forced to deal with an ever increasing student load. One likely means of relief would be to provide guidance in groups wherever possible, thus freeing the counselor's time to deal with individual problems as necessary. Yet, until further definitive research on group guidance methods is available, the guidance worker is uncertain as to what guidance functions may safely be handled by the group approach.

In business, industry, and government, particularly in the Armed Forces, when there is an acute operating problem on which research and development might provide the answer, the necessary money is set aside for an intensive and immediate attack on the problem. Usually the investment is repaid many-fold in increased operating efficiency. In the opinion of this reviewer, with the exception of one national survey, the research reported in this chapter does not exceed what one large city school system might reasonably be expected to produce in the field of guidance during a three-year period. This is not to disparage the initiative and professional zeal which prompted the investigators whose contributions are reviewed in this chapter to undertake their research and report their findings. Until education regards research as a necessity and plans well-coordinated, comprehensive investigations on such topics as group guidance and group therapy, we may expect to read every three years, a summary of intriguing but inconclusive investigations which will have little effect on guidance practices. Even without additional funds for research, effective coordination of effort, perhaps thru professional societies, will produce immeasurably better research than has been produced to date by a system which depends entirely upon private initiative.

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CHAPTER VIII

The Evaluation of Guidance Services

WILLIAM C. COTTLE

A COMMENT by Dressel (11) about research in college counseling to the effect that little of it appeared to be planned to produce practical counseling implications could be paraphrased to cover evaluation of guidance services. Most of the attempts to evaluate apply only to parts of the total program of guidance services; the experimental designs used rarely have any major features in common.

Various criteria for evaluating programs have been proposed. Jensen, Coles, and Nestor (23) attempted to remedy defects mentioned by Dressel by proposing desirable characteristics for the criterion variable, criterion instrument, and criterion scores. This is one step toward a common approach to evaluation. Another step is the proposal by Butler (4) of a system of behavior categories and an experimental design involving factor analysis for comparing trends within and between individuals. Calvin (5) pointed out his dissatisfaction with the experimental design of an evaluation of client-centered counseling in a study by Dymond. He claimed defects in the design obscured the reasons for client change which might therefore be due to passage of time alone. A number of other studies highlighted this last possibility; Eysenck (13) suggested that neurotic persons who do not receive therapy appear, over the course of time, to improve as much as those who do.

Coleman (8) described 12 criteria for evaluating guidance services in the elementary school. However, seven of these criteria applied to teachers' knowledge of individual differences and mental hygiene; only five criteria dealt directly with guidance services. This confusion over the definition of *guidance* was also evidenced in an article by Mennes (33) where the term *guidance* was used to describe individual attention given by teachers of "multiple period" classes combining world history and English. *Guidance* as used in this chapter applies to phases of a program requiring special training beyond that of most classroom teachers. The bibliography covers only published articles and does not include unpublished theses such as those listed by Cottle, Callis, and Polmantier (10).

Total Programs of Guidance Services

Turney and Morehead (41) used a fairly complete testing battery to compare an Arkansas high school having a program of guidance services with one where no program existed. While the results were not conclusive regarding the effects of counseling, 4 of 14 analyses of covariance favored the school with a counseling program. Winston (44) used *Section G,* *Evaluative Criteria* completed by three expert judges and personal interviews with pupils, parents, teachers, and administrators to evaluate the guidance program in a Missouri high school. These evaluative technics produced better results in combination than in separate use. Where pupil interviews were comparable to judges' ratings, there was close agreement. This study pointed up the need for keeping parents and schoolboard members adequately informed of the nature and purpose of the guidance program in order to have competent evaluation. Sageser (37) evaluated a pioneer program of guidance services in a small Louisiana high school, using opinions of parents and teachers. They felt it was valuable, but no statistical evidence was presented to support the view. Cantoni (6, 7) used a unique reunion party in 1952 to follow up 259 men and women graduated from a Flint, Michigan, high school in 1943. Out of original groups of 234 counseled experimentals and 234 noncounseled controls, 140 of the former and 119 of the latter were graduated and living. These filled out a questionnaire and took the adult form of the *Bell Adjustment Inventory*. When compared with earlier scores on the *Bell*, both groups had improved in adjustment during high school. The controls had regressed since graduation, while the experimental group had made further improvement. Education beyond high school, college degrees, job level, economic status, and cultural level were greater for the counseled group than for the group not counseled.

A number of studies dealt with college personnel programs. A report by Kaess and Long (25) of 79 counseled veterans matched against a noncounseled control group showed no significant differences in grade-point average or job satisfaction. This study demonstrates the need for multiple criteria and closely controlled experiments. A study by Braden (3) of former students at Colorado A. and M. College revealed that counseling was not particularly helpful in postschool adjustment. These former students felt knowledge of interest and ability test scores was most useful and that they were not helped much in the personal-social area. A follow-up of 54 male white anxiety neurotic veterans counseled under Public Law 16 in a college center was reported by Kir-Stimon (27). Twelve criteria were used to compare them before counseling and selection of a training goal and after termination of training for this job. It was found that neuropsychiatric veterans compared favorably with general population and that 70 percent made average or better adjustments. Kamm (26) in a survey of student personnel programs in 40 large and small colleges found no repeated or systematic approach to research and evaluation. He recommended the *1953 Evaluation Aids* of the National Association of Student Personnel Administrators as a means of evaluating college programs. Lloyd (28) used more than 200 conferences with educational representatives of countries outside the United States to evaluate college personnel programs. He concluded that the United States was the only country with integrated and carefully organized programs of student personnel services altho Japan was beginning such work.

Counseling

Investigations of counseling took varied forms. Gaudet and Kulick (19) found that a random sample of 321 veterans did not differ from the norm group for the *Minnesota Personality Scale* (MPS). When they contrasted responses of 200 cases checking only educational-vocational problems with those of 200 cases checking psycho-social problems, they found highly significant mean differences on all scales of the *MPS* except "Morale." This seems to indicate that some clients are willing to admit psycho-social problems before counseling begins. Form (16) developed a *Counseling Attitude Scale* which distinguished degrees of satisfaction with counseling among a group of Michigan State College students. In another part of the study (17) he reported that students with poor high-school counseling were more frequent visitors to the college center. There was a slight trend for lower middle-class students to use the center more and for those with lower grade-point averages to do so. Nonusers surveyed were older, upper classmen, and married. It is interesting that Form found counselees more impressed by counselor services than by personal qualities.

MacGowan (30) reported that the methods used by the counselor were not related to client satisfaction. He also noted that counselors chose technics of counseling suited to their personality in spite of common training. Forgy and Black (15) in a follow-up of clients pointed out that while this difference among counselors may be a good thing, the counselor's own preferences may not be valid criteria for determining his most effective counseling methods. They also failed to find that a significant difference in the results of client-centered and traditional counseling methods discovered in an earlier study still existed three years later. They wondered if the original difference may not have been an artifact of the experimental design.

Singer and Stefflre (40) presented a method of sharpening discrimination in self-estimate research in counseling. They suggested use of tests of significance in variability of standard deviations as well as the usual tests with means and correlation coefficients. In self-estimate research itself Berdie (2) indicated that agreement between self-ratings and objective measures can be influenced by counseling altho few clear-cut differences between his experimental and control groups appeared. Ewing (12), in a study of changes in attitudes during counseling, noted that the most improved clients bore more resemblance to the ideal self they indicated prior to counseling. He showed that changes in counselee ratings of self, parents, and counselor after counseling tended to resemble actual changes in the counselee and reflected influences encountered during counseling. Jenson (24) and Correll (9) used client satisfaction as an indication of effectiveness of counseling. A number of studies in the field asked searching questions about the value of client satisfaction as a criterion; the consensus is that other criteria are needed as well.

Until it is possible to develop research designs which are more precise and involve a number of settings simultaneously, most of the outcomes of counseling research will be inconclusive and may not be worth the effort.

Group Programs

Increasing demands for guidance services produced several studies of the application of group technics to phases of counseling. Malloy and Graham (31) tried group orientation and a common test battery after sorting clients by an intake interview. They reported the method worked with clients whose problems of vocational choice were benign in character and had no dramatic or unusual qualities. Morgan (34) used a questionnaire to survey effects of mailed reports of group testing and concluded mailed reports were not harmful altho bright students profited more and predictions were more accurate for them than for students with lower scores.

Hoyt (22) contrasted group and individual counseling with a control group according to satisfaction with, certainty of, and realism of vocational choices (and a combination of these). He found group and individual counselees increased on all variables, while the controls decreased. No significant differences appeared between the group and individual counseling methods. Ballin (1) used change in self-concept to investigate an adult program of group guidance. Clients rated their personal adjustment as improved during counseling, but not during an equal interval of "no-counseling." Comments made elsewhere about the limitations of self-rating versus counseling outcomes apply here also.

Testing Practices

Considerable research appeared, attempting to evaluate testing practices as related to various guidance services. Froehlich and Moser (18) considered the recurrent problem of whether counselees remember test scores. They found considerable variation between actual profiles of ninth-graders on the *Differential Aptitude Tests* and a profile drawn from memory 15 months later. As might be expected, more pupils reported their highest score accurately and more bright pupils presented accurate profiles than did low ranking pupils. Froehlich and Moser imply but do not state the hypothesis that counselees remember accurately test scores which are in line with their self-concept and inaccurately those which are not. Rogers (35) compared amount of client participation in a test-centered interview and found no difference in effectiveness of two methods. He concluded that the same counselor could not vary his procedures enough to produce differences by the two methods.

Walker (42) tried to find out whether counselors could use data on students five or six years after students had left school in order to estimate scholastic and job performance. Altho there was a wide range of prediction, counselors were more accurate in predicting school than in predicting job performance. Predictions were better for brighter students, but their school performance was overestimated. The school performance for duller pupils was underestimated. Young (45, 46) compared the ability of college freshmen to predict their college progress with that of their college advisers. Freshmen could do this as well as or better than the advisers could. Hackett (21) found that voluntary counselees on probation who worked with advisers did not obtain higher grades than those secured by a control group of 77 students on probation without counseling. However, 89 percent of the students felt counseling was of value. These last two studies raise some questions about the value of certain college advisement programs. Faries' study (14) involved trained counselors (in contrast to advisers of uncertain background); she found that 77 percent of an experimental group counseled voluntarily were graduated, in contrast to only 51 percent of a noncounseled control group.

An evaluation of the effectiveness of a measurement project at Duke University by Weitz, Colver, and Southern (43) emphasized that personnel programs may be inefficient in not using available information to cut costs of further testing.

Miscellaneous Guidance Services

A check on the use of orientation programs in a typical sample of 69 colleges with enrolments between 150 and 2000 was conducted by Greene (20). He found that about half of them had orientation courses; in these colleges the students gave the courses a positive evaluation. Schmidt (38) developed an evaluation sheet for individuals participating in college activities. Use of the device improved quality of participation in activities but had little effect on amount of participation.

Malouf (32) discussed the evaluation by Utah high schools of the pupil plan sheet in statewide use. Schools felt it improved their guidance services by producing better educational-vocational plans among students, better motivation, and an impetus toward counseling; in addition it was an aid in interviewing.

Three studies report evaluations of the use of occupational information. Rubinfeld (36) reported that a weekly group career conference used to replace a career day in the occupational information program provided better quality and coverage of occupational information. Lowenstein and Hoppock (29) investigated adjustment to college of high-school students who had had an occupations course versus a matched group who had not. They concluded that the experimental group made a better college adjustment as freshmen. Shosteck (39) surveyed Philadelphia and New Haven high-school classes to evaluate the effectiveness of occupational information services. His findings emphasized the importance of tailoring occupational information to the local scene, the need for more informational emphasis on education beyond high school for higher level jobs, and the need for a more careful check on student career plans.

Summary

This review for the three-year period indicates the paucity and limited nature of published research on the evaluation of guidance services. There is great need for cooperative research among institutions and for research designs of better quality.

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INTRODUCTION

Research on the general aspects of curriculum planning and development is analyzed in this issue of the Review. Research reported during the period since the publication of the June 1954 issue (Volume XXIV, No. 3) entitled "The Curriculum: Organization and Development" is included. However, since several topics included in this issue were not previously reviewed, some studies published prior to January 1954 are listed.

Since curriculum planning is a broad and comprehensive undertaking, the committee for this issue has endeavored to review research in a number of broad aspects of the subject. At the same time the committee has attempted to avoid duplication of other recent issues dealing with specific phases of the curriculum.

Analyzing research in the curriculum area is indeed a difficult assignment. Ultimately, decisions in the area of curriculum planning must be based on value judgments, and such judgments are not usually accepted as research in the strict definition of that term. Certainly, research should be used extensively in formulating value judgments, but it is doubtful if the decisions that must be made in curriculum planning can ever be determined solely by the application of research technics. Therefore, in preparing this issue of the Review, the committee has perforce included many studies and publications that provide worthwhile and excellent statements of points of view and principles basic to curriculum planning. These seem to constitute materials as important for analyzing the process of curriculum planning as are technical research studies that conform to the canons of research.

Members of the committee reported that definitive research on many basic curriculum problems is utterly lacking. Educators have not had the resources or time, apparently, to carry out thorogoing and penetrating research studies of many important aspects of curriculum planning, or probably more significantly, no one has yet been able to design research studies which provide sound conclusions about many major curriculum problems. This paucity of research in the curriculum area has long been noted by writers in this field and by research workers generally. But one must always consider the question of whether studies that explore basic issues in terms of philosophical concepts and principles, utilizing a system of carefully defined values, may not be the best kind of research for the area of curriculum planning. Obviously, such pronouncements and writings should be thoroly scholarly, clearly indicating basic assumptions and philosophical principles utilized in arriving at judgments, but nevertheless perhaps they need not rely solely on quantitative evidence for conclusions.

In preparing this issue of the Review, the committee had to decide how far it should go in utilizing such philosophical statements. References include many articles and books of this type, but they all were carefully selected by members of the committee because of the significance of their contribution to the clarification and definition of curriculum issues. The problem is illustrated by the fact that the committee had originally planned a chapter on curriculum issues but decided to drop the chapter when it became apparent that many of the statements currently being made on curriculum issues are not based on reliable evidence, utilize faulty assumptions about the educative process, and display a lack of rational argument.

The bibliographies included in this issue indicate the contributions to be found in doctoral dissertations submitted as a part of graduate requirements at major universities. It is regrettable that educators have not yet found some feasible method for making the results of such investigations more readily available to curriculum planners thruout the country. The members of the committee searched diligently for such research studies, but they recognize that a number of significant reports may not have come to their attention.

In view of the lack of definitive research on many aspects of curriculum planning it is indeed gratifying to know that a number of research agencies, such as institutes, field centers, and study councils established by colleges and universities, are actively engaged in carrying on significant research studies in the curriculum area, many of an action research character. The new research program of the U. S. Office of Education also should enable educators to carry forward important studies of value to curriculum planning. Many educational foundations have long made funds available for the study of curriculum problems. But much remains to be done.

J. GALEN SAYLOR, *Chairman*
Committee on Curriculum Planning
and Development

CHAPTER I

Curriculum Organization and Development in Historical Perspective

GEORGE A. BEAUCHAMP *

IN THE last issue of the REVIEW devoted to the subject of curriculum (1), studies utilizing a historical approach were included under titles dealing with some specialized phase of curriculum and curriculum planning. It is the intent of this chapter to discuss research and other materials based upon research focused upon trends in curriculum development, histories of education and historical studies in special fields, historical development of curriculum in individual or state school systems, and literature of curriculum terminology.

Trends in Curriculum Development

Trends in curriculum development were last reported in various sections of the June 1954 issue of the REVIEW (1). Merritt and Harap (49) reviewed trends in the production of curriculum guides as reflected by the output of publications during the period 1951-1953. Harap (33) reviewed trends in curriculum practices and planning procedures. He noted emphasis upon fundamental and useful learning, learning to work and live together, and a continuous demand for artistic and musical training for children. A continuing trend in the fusion of related subjects with core emphasis in the junior and senior high school was indicated. Leaders in curriculum development were reported as concluding that the individual school is the most effective instrument for curriculum change. Caswell and Bellack (18) also reported curriculum developments of recent years. They identified four areas that have become crucial in connection with curriculum development: (a) modern construction of the fundamentals of education, (b) differentiation of the role of the educator from that of the lay citizen in curriculum change, (c) assurance of quality of teaching and learning, and (d) the preservation of freedom of teaching and learning. Russell and Parker (56) reviewed some of the conditions that have influenced curriculum development over the years and discussed various guides to research for teachers. They concluded with eight suggestions for implementing research knowledge. Koopman (41) identified trends toward more mature cooperation in curriculum development by all persons concerned. Brauer (13) investigated trends in state legislation affecting the curriculum of the public

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* David Rappaport, graduate student at Northwestern University, assisted in collecting the materials for this report.

schools by examining public-school curriculums as provided by state law in each of the 48 states in 1930, 1940, and 1950. He noted that more provisions were being eliminated than added and that the subjects most frequently being added by legislation were conservation of natural resources and treatments of alcohol and narcotics. He concluded that legislative attempts have been haphazard.

Research workers were also concerned with curriculum trends in individual school subjects. Shane (59) brought the results of research in language arts together and focused them upon improvement of methods and curriculum. Hodgson (37) reviewed the trends in social studies programing in elementary schools and presented the main content of offerings in social studies by grade level. Junge (39) discussed current trends in the selection of content and organization of arithmetic experiences; she noted stress upon meanings and upon problems of everyday living. Eakin (23) summarized trends in children's literature from the early 1930's to the present time. Within the period covered by this chapter, four issues of the REVIEW (2, 3, 4, 5) were compiled under the titles, "The Educational Program: Later Adolescence," "Instructional Materials," "Language Arts and Fine Arts," and "Vocational and Technical Education." Three issues in the series, "What Research Says to the Teacher," have not been reviewed previously in this journal: Fehr (26) interpreted research for the teaching of high-school mathematics, Barnard (7) the teaching of high-school science, and Fay (25) reading in the high school.

Trends at the various school levels were studied. Specific studies of trends in the elementary-school curriculums were lacking, but such authors as Otto (52) and Herrick and others (34) dealt with the evolution of the curriculum and with current issues in curriculum planning. More specific trends were identified in the curriculum of the junior and senior high school. Fouts (28) noted the trend in the junior high school away from subject-centered programs toward integrated programs. Koos (42), in a larger treatment of the same subject, observed the same trend and particularly emphasized program integration and enrichment. Gruhn and Douglass (32) included among trends, in addition to those above, lay and pupil participation in curriculum planning and curriculum emphasis upon citizenship preparation. Lentz (45) traced the historical development of the junior high-school program and indicated current trends. Brink (14) studied patterns of curriculum organization in 252 large secondary schools. He found that approximately 53 percent of them offered multiple-type curriculums in which each curriculum once undertaken was fully prescribed; the remainder had programs in which some courses were elective and others prescribed. He noted trends toward fusion of language arts subjects, attempts to adapt subject content to life needs, and an increase in courses for slow learners and gifted children. Bossing (11) investigated the trend toward core curriculum in the senior high school; he found 25 percent more core courses at the tenth-grade level than at the ninth-grade. Among the schools with core courses, 50 percent reported core courses representing large blocks of subjectmatter, and 63 percent reported core courses organized around personal-social problems. Cremin (20) reviewed the secondary school and its program in historical perspective. He anticipated a new view of secondary education different from basic values held in the past and noted a particular need to define more sharply the secondary school's distinctive contribution to human needs. Douglass (21), Faunce (24), and Romine (55) devoted chapters to the history of and current trends in the secondary-school curriculum. Bond (10), Hockett (35), and Hockett and Bond (36) interpreted elementary- and secondary-school curriculum trends in terms of teacher education programs.

In a very significant issue of the REVIEW, Cook, Hovet, and Kearney (19) reviewed 25 years of curriculum research.

Histories of Education and Historical Studies in Special Fields

One weakness in curriculum research is the lack of systematic study of the history of curriculum development based upon original sources and devoted exclusively to that topic. The most exhaustive efforts in this direction are included in histories of education. Several good examples were published during the period of this review. Butts and Cremin (17) traced the development of schools and school programs in the United States from the perspective of cultural history. Butts (16) approached the history of Western education in a similar manner. In general histories of American education Drake (22), Good (31), and Noble (51) devoted sections and chapters to the evolution and interpretation of school curriculums of the various eras of our history.

The burden of historical research in subject fields has been borne by doctoral students. Each study makes its unique contribution, but it is impossible to discern any common conclusions. King (40) analyzed algebra textbooks used in American secondary schools before 1900 in terms of modern standards for similar textbooks. The teaching of government in secondary schools from 1861 to 1930 was studied by Pettersch (54). He particularly noted a gradual movement toward fusion practices in the social studies and modern problems courses. Gilbert (30) examined recent United States history textbooks in order to observe changes in the treatment of foreign affairs since 1865. In the last three decades substantial increase in linage devoted to foreign affairs was noted. In an attempt to discover trends in the objectives, content, and emphasis in the teaching of American history in the senior high school since 1890, Skaurud (61) consulted reports of national committees, the contents of courses of study, statements of recognized leaders in educational literature, and contents of American history textbooks. He noted general agreement between textbooks and national committee reports and increased attention given to social and economic history, international relations, and America in a world setting. In recent issues of the REVIEW, London and Spence (47) reviewed historical studies in the field of industrial education, and Leonhard (46) reviewed the history of music education. Mehl (48) studied the major developments of public secondary education during the 1890's.

Historical Development of the Curriculum in Individual or State School Systems

In comparison with the number of curriculum studies that are undertaken by individual school systems, few historical accounts of these endeavors are recorded in the research literature. If a curriculum guide results from these endeavors, the steps taken are often recorded in the preface to the document. These will not be reviewed here. Several studies of a historical nature, however, have come to the attention of the reviewer. Becker (9) presented a history of the development of the course of study in geography in the New York City high schools from 1898 to 1953. His technic was to analyze annual reports of the superintendent of schools and the publications of the high-school division of the board of education. Treatman (64) studied the administrative reorganization for curriculum development in the public elementary schools of New York City between 1925 and 1950. In treating the history of the Drury High School, North Adams, Massachusetts, Patterson (53) traced its development from a single-purpose college-preparatory institution in 1869 to a modern high school with a multiple-curriculum program. Fordyce (27) portrayed a two-year program of major curriculum revision in Euclid, Ohio. Russell and Lake (57) described curriculum development procedures at the systemwide level in Racine, Wisconsin, and pointed out the major principles of operation that emerged in the process.

A number of historical studies related to the development of curriculum in state school systems; again we are indebted to doctoral students for the majority of these. Most of the studies treated some specific aspect of curriculum development or an effect of some social force upon curriculum; few were general reports of statewide curriculum-planning efforts.

A survey of the effects of the Missouri School District Reorganization Law of 1948 upon the high-school program in that state was conducted by Bounous (12). Information was gathered from the Missouri State Department of Education and district supervisors of public schools. Results were interpreted in terms of trends in course offerings. Broach (15) compared the course offerings in the secondary schools of Arkansas in 1929-30 with those of 1951-52. Trends were identified by noting additions, deletions, and expansion in the course offerings. Jones (38) studied the roles played by the legislature, the state board of education, and the local school districts in developing the program of civic education in the state of Washington between 1853 and 1953. It was found that the legislature had provided basic foundations for civic education by compulsory attendance laws and by laws requiring the teaching of history and government of the United States and of the state of Washington. Leadership by the state education authorities was indicated thru published courses of study. Springer (62) surveyed educational change in Pennsylvania affected by legislation and administrative interpretations between 1929 and 1954. Timmerman (63) made an analytical classification of various curriculum designs supported by educational theories and practices developed within recent decades, and as a second part of his study, compared the practices of South Carolina high schools with each classification. Frick and Moorer (29) described the initiation of the statewide organization of the Florida Council on Secondary Education. The general purpose of the council was to initiate curriculum study on the state level with specific attention to secondary schools. Steps in organizing the council and establishing its purposes were outlined. The curriculum improvement movement in Oklahoma during 1952 and 1953 was described by Young (66). Tyler (65) reported the study of work experience programs in California high schools and junior colleges made under the auspices of the California State Department of Education.

Curriculum Terminology

It might be argued that a section devoted to curriculum terminology does not belong in a treatment of historical studies. However, terminology related to curriculum has been culturally generated, and the use of such terms should be subjected to review. Exhaustive review of this field is not possible within the limits of this chapter; therefore, representative writings will be cited.

Curriculum terminology was labeled "verbal jungle" by Shane and Yauch (60). The undergrowth is thickened by variations in such areas as curriculum definition, curriculum types or types of curriculum design, relationships between curriculum and teaching methodology, and technics of curriculum planning. A study by Morgan (50) indicated that confusion in terminology exists in industrial arts and vocational education.

Three basically different definitions of curriculum were identified in the literature by Shane and Yauch (60) and Beauchamp (8). The first of these defines the curriculum in terms of the experiences of children under the jurisdiction of the school. The second defines the curriculum in terms of social need or social design for institutionalized education. The third approach is to think of the curriculum as the psychological changes brought about in pupils because of their activities in school. The existence of such basic differences suggests a need for greater agreement as to what is meant by the term *curriculum* and thus opens the topic for research investigation.

Writers of curriculum literature continue to describe various curriculum types or types of curriculum design. For example, Anderson (6), Beauchamp (8), Herrick and others (34), Krug (43), Krug and others

(44), Otto (52), Saylor and Alexander (58), and Shane and Yauch (60) discussed such curriculum types as the subject, correlated, broad fields, fused, core, activity, child-centered, integrated, problems-of-living, and experience curriculums. Frequently these are arranged between polar extremes of subject-centered and experience curriculum patterns. Research is needed to determine the degree to which these various types are operative.

From the foregoing kinds of observation this reviewer is prompted to suggest that there are a number of key concepts repeatedly used in different ways in curriculum literature. It has already been pointed out that the term *curriculum* represents a different concept to various writers. The word *experience* may be used in the dictionary sense as an occasion or activity; at another time it is used in a philosophic sense as in the writings of John Dewey. In curriculum theory this distinction needs to be carefully clarified. *Curriculum guide* means many things to different persons. *Curriculum design* and *curriculum theory* need more careful delineation. Writers and researchers could contribute greatly to reduction of communication problems in the area of curriculum by devoting attention to the improvement of curriculum language.

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CHAPTER II

Status of the Curriculum

RALPH C. PRESTON and ESTOY T. REDDIN

During the period under review, curriculum research revealed the persistence of certain well-known patterns such as the nondepartmentalized character of the elementary school and the predominance of English and social studies in the high school. It also revealed the presence of dynamic elements. For example, there was increasing experimentation with the core curriculum, and rapid expansion of foreign languages in the elementary school and of driver education in the high school. Timely experimental studies were reported in which the current public-school curriculums were compared with curriculums of the past and with curriculums of independent schools.

Curriculum Organization

Surveys by Dunn (15) and Molyneaux (40) showed that the prevailing pattern of the elementary school provided one class per teacher. At the junior high-school level, Wright (57) reported wide variations among states in policy relating to departmentalization. She pointed out that a number of states discouraged complete departmentalization in Grades VII and VIII in favor of multiple periods under a single teacher for a part of each day. The success of this arrangement was affirmed by Spivak's findings (51) that pupils who had attended self-contained classrooms in Grades VII and VIII did better both academically and socially in Grade IX than pupils who had attended departmentalized classes in Grades VII and VIII.

Krug, Liddle, and Schenk (30) studied 44 high schools in Wisconsin which had multiple periods. Reasons advanced by these schools for adopting multiple periods were (a) to ease the transition between elementary and secondary school, (b) to reduce the pupil-teacher ratio, and (c) to provide desirable correlation and fusion of content. Slightly more than half of the schools confined their multiple-period plan to Grades VII and VIII. Multiple-period work commonly consisted of combinations of English and social studies.

Types of Curriculum Programs

Brink (8) examined the programs in 252 high schools and discovered that slightly over half of them were multiple and the remainder consisted of "constants plus variables." The major types of programs and the proportion of schools which offered each were: college preparatory (100 percent), commercial (84 percent), general (76 percent), industrial arts

(65 percent), home arts (40 percent), agriculture (22 percent), fine arts (20 percent), and nursing (5 percent).

Core Curriculum

Bossing (6) gave an account of the status of the core curriculum in 1000 senior high schools thruout the United States, on the basis of a 45-percent questionnaire return. Nine percent of the junior-senior high schools, 6 percent of regular high schools, and 7 percent of senior high schools had core courses. These figures, Bossing showed, were higher than comparable figures which had been reported for 1949. Approximately 15 percent of the schools not offering core courses either contemplated doing so or foresaw the possibility of their doing so.

Timmerman (53) explored the curriculum practices of 54 high schools in South Carolina. Despite what he described as the subject-centered nature of the state's requirements, he found that 57 percent of the schools were studying curriculum reorganization, with core courses established in 4 percent of the schools.

Troops (54) made an intensive, firsthand investigation of 10 city school systems in Indiana, all of which had core courses. She found most of these courses in Grades VII and VIII. Prevalent core practices included allotting two consecutive periods for core classes, assigning one teacher for each core class, organizing the classes heterogeneously, and placing emphasis on academic subjects. There was little provision for guidance or teacher-pupil planning.

In view of the heavy preoccupation of many core courses with English and social studies, Alberty's analysis (1) of potential mathematical content was of timely significance. She revealed that mathematical concepts were essential to 271 of 1262 core activities in 16 problem areas. She pointed out the implications of her findings for the preparation of core and mathematics teachers.

Enrolments, Time Allotments, and Emphases by Subject

Lindsay (35) reported high-school enrolments in California. The subjects ranked as follows (figures denote proportion of all students enrolled): English (100 percent), social studies (95 percent), mathematics (63 percent), science (45 percent), business (39 percent), industrial arts (38 percent), music (30 percent), homemaking (27 percent), foreign language (22 percent), art (21 percent), vocational agriculture (0.5 percent), and trades (0.2 percent). Roehr (46), also working with California data, found English and social studies enrolments practically equal; English held a slight edge perhaps because those courses in which English and social studies content were part of a single course were counted as English. These reports from California are not to be interpreted as even approximations of national indexes since enrolments vary considerably from state to state. For example, Donovan (13) reported that the combined enrolments in foreign languages in New York State constituted 48 percent of the total enrolment.

English

Day (11) analyzed English programs in Iowa high schools and found that more time was devoted to literature than to language and speech. Salter (47) reported that English classes in Texas gave increasing emphasis after World War II to ideals of citizenship, nationalism, and communication in everyday life.

Social Studies

Fraser (24), in summarizing her own research plus that of Duffey (14), Hodgson (27), and others on the status of elementary-school social studies, concluded that "fusion" and "integration" were the predominant patterns of organization and summarized the commonest subjectmatter in elementary-school social studies. Jones (28), in a survey of social studies programs in large city high schools, reported that 14 courses were offered and specified their commonest grade placement. Skaurud (49) reported that increasing attention has been given since 1890 to social, economic, and current history and international relations.

Mathematics

Brown (9) investigated the programs of 857 high schools. The schools had enrolments in geometry equal to 34 percent of Grade X enrolments; in intermediate algebra, to 23 percent of Grade XI enrolments; and in senior mathematics, to 10 percent of Grade XII enrolments. He reported a decrease in enrolments between first and second semesters of mathematics courses—as high as one-third in the case of intermediate algebra, with a larger proportion of boys than girls dropping out. Wiseman (56) found that the students entering South Dakota A. and M. College had taken slightly more mathematics in high school than had been taken by students 10 years previously and that 40 percent of the men students had taken mathematics beyond algebra. The gifted student was probably better cared for in mathematics than in most branches of study if Roach's findings (45) in Indiana hold elsewhere; he reported that 46 percent of schools had some type of mathematics program designed for the gifted.

Science

Science has long been a stepchild in the elementary school. Auletto (3), studying its status in Delaware, discovered that 56 percent of the elementary-school teachers felt they were teaching science inadequately. The teachers he queried ranked science ninth in importance among the various elementary subjects. At the secondary-school level, according to Flannigan (22), general science courses were replacing specialized courses such as chemistry and physics; increased emphasis was placed upon teaching broad understandings which contribute to a grasp of scientific method and critical thought. Foster (23) investigated the science programs in Missouri and found that, in company with fine arts, science had the fewest number of course offerings (only general science and biology were offered in the majority of schools) and that fewer students were enrolled in science than in any other subject. Foster also disclosed that in Missouri more temporary teaching certificates were issued in science than in any other subject. Of the science teachers he studied, 26 percent failed to meet requirements for teaching science.

Business Education

Van Wagenen (55) studied the enrolments in business education in California. He found typewriting to be the leading subject, accounting for approximately 40 percent of the total business education enrolment. Accounting and bookkeeping (a combined subject) was a poor second, its enrolment accounting for approximately 11 percent of the total.

Foreign Language

One of the most promising trends in the curriculum today is the growth of foreign-language instruction in the elementary school. A complete account of this movement was prepared by Andersson (2). At the time of his writing, 59 programs had been reported. Of 281 elementary schools in Michigan, according to Etnire and Loughridge (20), 29 reported one or more languages being offered, involving approximately 10,000 children. Mildenberger (38) reported that foreign languages were being taught to a total of over 270,000 elementary-school pupils in almost 2000 schools located in 357 cities and towns (as compared with 89 cities and towns in 1952) in 44 states and the District of Columbia; in 1941 fewer than 500 elementary-school pupils were studying a foreign language.

Enrolment figures given by Mildenberger showed Spanish leading with 222,000, then French with 47,000, and German third with 2500. Six other languages showed lower enrolments. Mildenberger cited a study by Annunciata which revealed that 157,000 children were studying foreign languages in 483 Catholic elementary schools in 285 cities and towns of 27 states and the District of Columbia. French was the leading language with Polish, Italian, Lithuanian, and others following in that order.

With respect to enrolments in public high schools the Modern Language Association (39) showed that since 1948-49 French has been gaining, German has been holding its own, and Spanish and Latin have been losing. Enrolments by language in terms of percentage of total enrolment were given as follows: Spanish (7 percent), Latin (7 percent), French (6 percent), and German (less than 1 percent). Forty years ago German was second only to Latin. Data were also supplied concerning eight other languages.

Driver Education

Some 10,000 high schools were polled by the Research Division of the National Education Association (42). Of these, 47 percent reported having some form of driver education and most of these granted from one-half to five-eighths of a unit for it. Mushlitz (41) reviewed the status of driver education in California, pointing out that it was generally offered as a separate course consisting of 30 clock hours altho one-fourth of the schools offered it as a part of other courses.

Electives

The nationwide mean with respect to elective units, according to Layton (32), was 9.2, or 58 percent of school time. Kretsinger (29) studied the programs of graduated college-bound students in the secondary schools of Oakland, California, and indicated that 63 percent of the students had taken an average of three semester courses of electives each year for four years.

Requirements for Graduation

Social studies was the most frequent state requirement and English came next according to Layton (32) and Wright (59). In a survey of social studies requirements among 107 large cities, Jones (28) found that United States history was the most commonly required branch with civics (or government) problems, and world history coming next in that order.

The shortage of scientists stimulated several investigations into the extent to which mathematics and science were required for high-school graduation. Wright (59) reported that a number of states reduced their requirements in mathematics and science since 1932. Layton (32), in a study of state requirements for graduation in 47 states and the District of Columbia, found the nationwide means of Carnegie units required in four subjects as follows: English, 2.8; social studies, 1.7; science, .7; and mathematics, .6. On the other hand, many schools go beyond state minimum requirements. Thus, Brown (9), in studying the requirements in 857 schools thruout the nation, found that 92 percent required at least one year of mathematics; for college-bound pupils, nearly three-fourths of the schools required at least two years of mathematics.

Aside from the basic subjects, Wright (59) noted that three other subjects were required—the effects of alcohol and narcotics in seven states, conservation in three states, and driver education in two states. (The NEA Research Division (42) stated that *three* states—California, North Dakota, and Virginia—required driver education.)

Statutory Provisions

Plischke (43) found that elementary-school curriculum legislation pertained to (a) nationalism (i.e., devotion to the interests of state and nation), (b) health and prohibition, (c) conservation of life and property, (d) practical and cultural subjects, (e) humaneness, (f) fundamental subjects, (g) religious and ethical subjects, and (h) miscellaneous subjects (i.e., science, social studies, and the like). Lehman (34) worked out a similar classification in analyzing legislation affecting the high-school curriculum.

Reutter (44), in reviewing curriculum law, found that it related to (a) specific elements of subjectmatter (such as the state constitution, spelling, and arithmetic); (b) ideas, attitudes, and influences (such as patriotism and moral conduct); (c) methods of teaching; and (d) texts and other materials. While most of the provisions were specified by state law, Reutter reported that some were contained in state constitutions.

Grimm (26) and Reutter (44) pointed out that some states enacted legislation to protect the rights of pupils and parents who object to specified subjects and activities on constitutional or conscientious grounds. Pupils in Illinois and Indiana who object to the study of disease on those grounds may be excused from it; and in New Jersey pupils may be excused from reciting the pledge of allegiance and saluting the flag.

Sources and Nature of Legal Requirements

Reutter's analysis (44) led him to believe that curriculum changes usually originate at the local level and that state laws tend to follow curriculum innovations of local districts. Dilley (12) analyzed four sources of legal authority which furnish the framework of the curriculum: (a) the Constitution of the United States, (b) state legislatures, (c) court decisions, and (d) regulations of local boards of education. He pointed out that even tho some prescriptive legislation may hinder desirable curriculum change, the courts have encouraged curriculum progress, and state legislation may be changed if the people so desire. Altho this is true, Lehman (34) noted that school law nevertheless possesses ponderous inertia, and, furthermore, states will often imitate the laws of one another. He concluded that while the state may properly prescribe subjects and activities, the details of instruction should be left to the professional educator.

Are the laws regulating the curriculum related to problems and needs arising from our rapidly changing culture, or are they of an arbitrary nature? Brauer (7) found comparatively few prescriptions related in a well-defined way to cultural changes. Lindsay (36) reviewed mandatory high-school instruction in California since 1872 and, in contrast to Brauer's findings, indicated a close relationship between legislation and social needs in the areas of manners and morals, narcotics, fire prevention, physical exercise and health, social studies, and public safety.

Driver training is an obvious need growing out of social change. It is pertinent to note that *School Life* (48) and several of the foregoing investigators (26, 36, 43) reported legislation calling for expansion of driver training and other aspects of public safety.

Trends in Volume of Legislation

Swingley (52) and Brauer (7) found the trend to be away from enacting laws which make specific prescriptions. Lehman (34) found a steady increase of prescriptions affecting the high-school curriculum, but at a diminishing rate. Plischke (43) found that the total number of prescriptions which were related to nationalism increased in all states during the war and postwar years, 1941-1951. Bevans and Peattie (4) reported on the history of prescribed instruction in California since 1904.

The difficulty legislatures have in keeping hands off the curriculum even after deliberately making the attempt was seen in Ohio where in 1943 all statutory requirements were removed except one (one unit of American history was required for graduation). The *Educational Research Bulletin* (18) reported that in 1955 the Ohio legislature abandoned its hands-off policy. It made instruction mandatory in seven fields of study and included a provision concerning the sequence of studies by directing that geography, United States history, the government of the United States, and other basic social studies areas must be studied by pupils before they may receive instruction in courses involving the more controversial subjects of social problems, economics, foreign affairs, the United Nations, communism, and the like.

Pressure Groups and the Law

The potent role of pressure groups in effecting curriculum legislation was brought out by Swingley (52), Plischke (43) and Lehman (34). At the secondary-school level Lehman found 45 organizations which were influential in bringing about curriculum legislation. Plischke listed 43 organizations which influenced directly the enactment of legislation dealing with the elementary-school curriculum. Among the organizations Plischke found particularly responsible for legislation in each of several categories were: *Nationalism*—American Legion, Daughters of the American Revolution, American Legion Auxiliary; *Safe Driving*—American Legion, Association of Casualty and Surety Companies, National Safety Council; *Humaneness*—Society for the Prevention of Cruelty to Animals; *Conservation of National Resources*—state teacher associations, Kiwanis, Lions, Rotary, Federation of Women's Clubs.

Effects of Legal Requirements

There has probably been too much speculation about and too little study concerning the impact curriculum legislation has upon instruction. Markert's investigation (37) of the effect of a Missouri law upon teaching is, therefore, of unusual significance and interest. He selected for intensive study a law requiring instruction in, and examination on, the state and federal constitutions. He studied its operation in 27 high schools in St. Louis. In general, Markert found that teachers complied with the law and gave greater attention to these subjects after the law's enactment than before. However, he reported that their attention tended to focus upon the required examination. The statutory prescription tended to restrict the teacher's freedom even in nonrestrictive aspects of the legislation, tended to yield a narrow and perfunctory program, and tended to limit the quality of instruction.

The Curriculum as Reflected by Pupil Achievement

The stream of "then and now" studies continued. Bloom (5), in making new sets of national norms for the *Tests of General Educational Development* in high schools thruout the nation, noted that the national level of educational competence among high-school pupils had risen significantly since 1943. The median level of performance in the various states varied considerably and appeared in the judgment of Bloom to be related to the extent of financial support given to education in the separate states and to the level of education of the adult population.

Lanton (31) found the composite achievement of Evanston pupils in Grades III and V in 1953 to exceed that of Evanston pupils in 1934. Sligo (50) compared the 1954 achievement of pupils in Grades IX and XI in 54 Iowa high schools with that of pupils who were in the same grades and schools in 1934. The 1954 group achieved significantly below the 1934 group in algebra, English correctness, and United States history. The two groups were equal in general science. However, the validity of these differences is dubious inasmuch as Sligo states that in 1934 the teachers devoted a large portion of their time to coaching their pupils for the examinations.

Impact of Core Courses

Wright (58) reviewed 10 years of research on the core curriculum; she concluded that core programs are only moderately successful in promoting growth toward their stated goals. Gale (25) compared the records of pupils who had taken a core program at a school in which it was an elective offering with the records of noncore pupils. He found the groups equally successful in terms of academic achievement in high school and college and in terms of social adjustment. Fair (21), using four tests of social sensitivity, reported core groups somewhat more socially concerned than noncore groups but not consistently or impressively so.

Public and Independent Schools

The Educational Records Bureau (17) reported that median achievement test scores for independent schools consistently surpassed the medians for public schools (except in the field of foreign language) at both the elementary and secondary levels. As the Bureau's report indicated, this difference is to be expected in view of the selective nature of the independent-school pupil population. The exception of foreign-language achievement is accounted for in the report by the probable higher scholastic aptitude of public-school pupils who elect foreign language study than that of public-school pupils enrolled in other subjects.

The higher medians of independent schools often create misleading impressions concerning the quality of the public-school curriculum. Several studies showed that public-school graduates actually exceeded the performance of independent-school pupils of comparable ability. Davis and Frederiksen (10), in a study of freshmen and sophomores at Princeton, found that public-school graduates made a higher academic average, in relation to ability, than did independent-school graduates. Dyer (16) analyzed College Board Scores and discovered that public-school pupils exceeded independent-school pupils in most of the tests. Elicker (19) reported that of those elected to Phi Beta Kappa at Harvard, Yale, and Colgate, more came from public schools proportionally than from independent schools.

Motivation

Lazarus (33) brought out the potent role played by motivation in pupil achievement. Three hundred incoming students in Grade X who had given evidence of enjoying reading and creative writing were invited to join a course which they were warned would be "stiff" and "concentrated." Of 28 who volunteered, eight dropped out on the first day. The 20 who remained had a median IQ of 104. At the end of the semester their achievement was compared with that of 20 students whose median IQ was 120 and who had pursued an identical course. The high-interest class exceeded the high IQ class in mechanics of expression, effectiveness of expression, literary appreciation, number of books reviewed, and number of written papers. The role of pupil motivation is so crucial and obvious that it is to be hoped that more attention will be given to it in future curriculum research.

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CHAPTER III

Factors Influencing Curriculum Development

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THAT education takes place in a social framework is taken for granted. In 1952 an entire issue of the REVIEW (2) was devoted to this topic. Because of the complexity of social forces influencing curriculum development, any exploration of particular factors must, by necessity, be selective. Larsen and Toy (35) classified such forces in curriculum change as (a) state agencies, (b) the federal government, (c) the profession (more than 500 national and regional organizations, more than 100 state bodies, and thousands of local units), (d) accrediting agencies, (e) special interest groups, (f) business and labor groups, (g) patriotic groups, (h) racial and religious groups, and (i) the community. Even this classification does not allow, however, for the more impersonal impact of social and political forces on a wider canvas.

Forces Representing the Processes of Change

Social changes influencing the curriculum include both the amount of population mobility (40) and its pattern. White, middle-class people with children are migrating to the suburbs of metropolitan communities, and the "inner cities" are becoming populated with what the Census Bureau classifies as "non-white." Four studies of school systems (44, 45, 46, 47) indicated some of the impact of suburban living upon the curriculum. They showed (a) concern over how to plan an educational program to counteract the accentuated homogeneity of age, ethnic background, and communities of commuting fathers; (b) entire new school systems built and staffed overnight with inexperienced teachers who tend to fall back on workbooks to tide them over their apprenticeships; (c) inordinate pressures upon youth to take academic programs so that they can get into college; and (d) problems of adjustment of the curriculum to the inequities created by outmoded means of financing education. (Levittown, New York, for instance, has no industries and few businesses. At the peak of its schools' enrolment it will have only about $2500 per child tax base. New York State, for comparable assessments, has an average of $15,000 per child tax base.)

Several states and agencies attempted to work on a curriculum design for migrant workers' children. These migrant streams following seasonal labor seem to have become a permanent part of American life, and the challenge to education to deal with this type of mobility was growing (16, 59). At the "inner city" the adjustment of the "newcomer" still besets curriculum planners (39, 41). Arter (3, 4) and Dodson (14) reported Manhattan studies which reflected the issues referred to here. They included such related items as (a) rapidly changing neighborhoods, (b) self-segregation of minority youth, (c) group self-hate of minority children, and (d) rigidity in school climates.

Racial and Intercultural Relations

The second aspect of change reflected in the research is that of racial and intercultural relations. The May 1954 decision of the Supreme Court apparently accelerated concern with this problem thruout America. The Fund for the Advancement of Education sponsored two studies of import for the school program (3, 67). Three national professional journals (15, 61, 63) devoted special issues to the problem. Four special reports of significance described the desegregation process and gave some consideration to curriculum in leading border cities (7, 11, 28, 62). In these communities outstanding pressures on curriculum included (a) better counseling and guidance, (b) more special-class programs including remedial reading and classes where bright children would not be held back by slow ones, (c) more special services such as health, (d) more attention to basic units dealing with racial and cultural matters, (e) new types of activity programs dealing with social groupings, and (f) concern with community climate as a factor in learning. Evidence of the sensitivity of education to this factor was indicated by the growing number of summer workshops devoted to it. From two such teacher education experiences in 1942 the number had grown to 38 in 1952 (55). Human Relations Centers in colleges and universities were also indicative of this trend. Epley (20) reported 11 such programs in American colleges and universities in 1955.

Technological and Industrial Change

The third force of change impinging upon curriculum relates to the realm of technology and industrial organization and the attendant changes in national character. Four books (38, 54, 57, 66) illustrated one aspect of such changes. In one way or another Mills, Riesman, Seeley, and Whyte said (a) there are enormous pressures toward conformity to white collar, middle-class society values; (b) increasingly both education and industrial organizations are manipulating people to such conformity by use of behavioral science technics; and (c) national character is delineated by "other-directed" rather than "inner-directed" forces. In addition, Warner and Lunt (64), Havighurst and Neugarten (29), Davis (12), and Hollingshead (32) emphasized a growing stratification of American society and evaluated curriculum in one way or another against class status. Not only were intelligence tests evaluated against this type of insight, but texts were restudied and teacher sensitivity to such problems was examined as well (51).

Factors Representing Ideological Differences

The second major impact on curriculum development is represented by forces stemming from ideological differences. High on such a list is the thorny problem of religious difference. Hager, Glock, and Chein (26) edited a number of the *Journal of Social Issues* on "Religious Conflict in the United States." In that issue Pfeffer (50) spelled out many of the issues with which curriculum makers are concerned; e.g., released time for religious instruction, controversy over moral and spiritual values, holiday observances, "godlessness" in the public schools, prayer recitation, distribution of Gideon (Protestant) Bibles thruout the schools, and baccalaureate services of public schools held in buildings owned by religious groups. Other studies dealing with this issue included those by Parker (49), an NEA commission (43), Thayer (60), Dawson (13), O'Neill (48), and Mason (37). At a different level is the work of Herberg (31) whose study documented a hypothesis that America is becoming a triadic culture of Protestant, Catholic, and Jew. The increased enrolment in churches may indicate a search for identification rather than increased religiosity. Herberg saw these pressures toward faith identification as all but inexorable. Educational curriculums contributed their share of the pressure in this direction according to the author.

The Cold War

The second pattern of ideological impact upon curriculum is that of the cold war with Russia and its sequela. Studies tended to preoccupy themselves with such issues as "How can we keep ahead of the Russians in scientific manpower?" (53) and "How can education be used to combat the manpower shortage?" On the former, Rettaliata found that from 1951 thru 1954, United States colleges and universities graduated only 116,000 engineers while the Soviet Union produced 154,000; the figures in 1954 were U. S. 20,000, U. S. S. R. 54,000. The factors responsible, he held, were (a) inadequate high-school curriculum, poor counseling, stress on general education, not enough required high-school courses (especially physics); (a) lack of high-school motivation; (c) shortage of qualified high-school science teachers (we are now producing less than one-third of the annual need of 7700); (d) college motivation (the top 25 percent of high-school graduates should go to college; only about 50 percent of these do so); and (e) the draft.

The Educational Policies Commission (42) listed (a) development of new and improved post-high-school programs; (b) guidance and counseling programs, and (c) education of the gifted as among the urgent demands upon education to meet the manpower shortage.

Folsom (22) confirmed the challenge of Russia and indicated a rise of freshmen in engineering from 6.5 percent of college enrolment in 1950-51 to 10.5 percent in 1955-56. Ginzberg (25) and an entire research program of Columbia University were concerned with solving human relations and with improving quality and quantity of education as measures for increasing national strength primarily and enhancing human personality secondarily. A conference jointly sponsored by the Educational Records Bureau and the American Council on Education was devoted to selection and guidance of gifted students for national survival (1).

Educational Ideologies

The third force which has involved curriculum development stems from differences in educational ideologies. Scott and Hill (56) published a compendium of many of the more salient challenges together with replies. From among the more outstanding criticisms of present educational leadership perhaps mention should be made of Bestor (8) who challenged anti-intellectualism, Lynd (36) who attacked present teacher education programs, and Flesch (21) who disagreed with modern reading methods.

More important were the attacks upon school systems which were typified by the Pasadena fight. The definitive study of this nationally discussed case is yet to be made. Hulburd (33) has perhaps done the best documentation of it to date. It is hard to understand why several good studies have not been done of Pasadena; Houston, Texas; Scarsdale and Port Washington, New York; and Denver, Colorado. Each would shed much light on this problem.

Forces Representing Community Power Structure

Following the war there were many deep cleavages in school systems due to clashes of interests in the community power structure. Hunter (34) demonstrated the nature of this structure. Warner and others demonstrated its operation in *Democracy in Jonesville* (65). In the postwar era many types of citizens committees were launched to assist in securing more school facilities thru community cooperation. Hechinger (30) studied the way the Connecticut group operated. Hand (27) reported on a statewide program in Illinois; and Edwards and Joslin (19), for a large community in New York State. There was no adequate study of the effects of the most ambitious of these programs, the National Citizens Commission for the Public Schools.

There seems to be no adequate study of the role of patriotic groups since the war. That such groups have been active is common knowledge. It may be singular that the climate of the times is such that there have come forward no Gellermans (24) or persons with the interests of Raup (52) to examine the influence of these groups on curriculum. In addition there has been no adequate assessment of groups such as the Minute Women, the White Citizens Councils of the South, and the Christian Front groups of the early war era.

Another dimension of official power in the community which has not been thoroly reviewed is that of state departments of education and accrediting associations. Seitz (58), Balyeat (6), and the California State Department of Education (9, 10) are examples of studies devoted to one or another phase of this question; definitive study of these agencies, however, is yet to be made. If it is assumed that what is evaluated for determines what is taught, this aspect of accreditation becomes important. In New York State where regents examinations are the basic standard for evaluation, the principal objective of some school systems is the preparation of students to pass these examinations. The role of the College Entrance Examination Board is yet to be determined. For the private schools and the high schools of states other than New York these ETS examinations are rapidly becoming a more important factor in high-school curriculum than is the supervision of state departments of education. The number of candidates taking these tests increased from less than 80,000 in 1948-49 to almost a quarter-million in 1955-56 (17, 18).

The influence of educational foundations upon curriculum making in American education has not been assessed. Examples of material which is probably influential are the reports of the Fund for the Advancement of Education (23) dealing with articulation between school and college and some of the encouragement given to use of closed circuit television and other aids to assist teachers where there are teacher shortages.

Summary

Altogether, studies made during the period under review seem to indicate much preoccupation with educational ideologies but small concern over the uniqueness of the community and what that means for curriculum. The forces which seem to be pressing education into new directions are the great impersonal ones. They seem to indicate more pressure to conformity. There is little sense of direction given by purposive efforts. Another facet of importance which seems to be indicated is that there is still great disagreement about the function of the secondary school in America. This debate will undoubtedly be accentuated as increased enrolments are more widely felt.

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CHAPTER IV

Design of the Curriculum

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THERE has been increasing interest in the problem of curriculum organization or design since the comparable issue of the REVIEW three years ago. This interest is still mainly theoretical and descriptive, but for the first time, healthy signs of critical, comparative, and explorative studies are appearing. Perhaps most promising of all is the growing number of theses on related aspects of curriculum planning. There seem to be real signs of a significant development taking place in this area of the curriculum.

The Ramifications of Curriculum Design

Saylor and Alexander (56) defined *curriculum design* as the framework or structural organization used in selecting, planning, and carrying forward educational experiences in the school. Design from this point of view is the framework within which the teacher and/or learner plans and develops learning experiences. Herrick (28) stated that a structure or curriculum pattern provides a consistent framework of values and their priorities for dealing with the operational decisions of the teaching-learning situation. A curriculum design and its attendant theory should have to do with (a) accounting for all the factors that are involved in curriculum; (b) defining the coherency of these factors both to themselves and to their action points; and (c) indicating the roles of teachers, children, and others in the process of curriculum planning. Essentially the same points were made by Passow (49) in his proposed plan for the education of the gifted and Courter (16) in his article on educational planning and the need for an explicit basic philosophy.

Common Curriculum Plans

Common curriculum patterns are the subject, broad fields, problems of living, and emerging needs approaches of the elementary school, and the subject and core curriculum approaches at the secondary-school level. Interest in these approaches during the past three years was concentrated in a few areas.

There was a growing interest in the nature of subjectmatter and its selection in curriculum. Wegener (62) made a case for the intelligibility of subjectmatter itself as an important factor in curriculum organization. Phenix (50) stated that because man can never know all that he needs to know, he must be concerned with the importance of concept formation, knowledge organized in idea systems, and the use of the principle of economy in selecting the most important concepts. Krug (35) and McClellan (37) investigated the differing conceptions of the nature of knowledge and pointed up the implication of this differentiation for curriculum.

Cooling (15) studied the nature of the criteria used for choice of subjectmatter in representative new-type curriculum proposals. Miel (41) presented the view that content of the curriculum should be defined broadly by the experiences of children and the social setting in which the educational process takes place. Fleming (21) discussed the research procedures involved in this selection. Foshay (22) explored the choice of content by formulating propositions about the nature of man and his rational powers. Tyler (60), while admitting the general value of this approach, criticized its adequacy *alone* to serve as a sufficient base for curriculum development.

In specific subject fields of arithmetic and science, Mueller (45), Riess (52), and Milgrom (42) discussed the bases upon which learning materials should be selected and organized. Ellsworth and Sand, in two key chapters of the Twenty-Sixth Yearbook of the National Council for the Social Studies (46), suggested ways for improving the social studies curriculum. Fraser (23) described the organization of the elementary-school social-studies program in a similar chapter in the Fifty-Sixth Yearbook of the National Society for the Study of Education.

The Experience Curriculum Design

Hopkins (29) in his latest book restated and extended his general proposition that learning in the school and in the home should be treated as a phase of the child's biological growth process thru which he discovers, releases, and develops his potential capacity into his maturing self. Archambault (2) examined the concept of knowledge as a process of reflective adjustment, learning as problem solving, the idea of the means-ends continuum, and the organic relations between methods and objectives as the key philosophic bases of the experience curriculum. Russakoff (53) examined children's interest as a means for curriculum improvement. Cogan (13) and Huebner (30) attempted to develop a theoretical framework useful in dealing with teacher-pupil interaction in the classroom.

The Core Curriculum Design

Birkmaier (4) restated the values of a core curriculum for adolescents as an opportunity for them to deal with problems important to all youth, to have their learning focused on meaningful problems, to consider relevant content without regard to subjects, to practice democratic group learning, and to be concerned with methods of problem solving. Mitchum and Isacksen (44) argued the effectiveness of the core curriculum in the junior high school; Bossing (6) discussed its development in senior high. Jackson (32) developed a measure of staff orientation toward core and subject curriculum theories and found that school staffs favor the tentative organization of the core plan over the fixed.

Wright (63) in her review of 53 doctoral dissertations developed in the 10-year period between 1946 and 1955 on the core program found them distributed as follows: eight on initiation and development of programs, 12 on surveys of general practice, five on administrative problems, 10 on content and subject utilization, seven on instructional methods and materials, seven on teacher education, and four on effectiveness of the core program. She pointed to the need for more research on the problem of relative effectiveness and on areas other than English and social studies fusion. Lurry (36) described the action research programs of a selected group of Maryland schools on core program development. Mennes (40) reported students' opinions of their experiences in core programs. According to Gale (25), graduates of core programs succeeded as well as or better than matched graduates of other curriculum patterns.

Curriculum Organization at Secondary-School Level

Brink (9) studied 252 high-school programs and found five general types of curriculum. The multiple program is the most common type (college preparatory, 100 percent; commercial, 84 percent; general, 76 percent; industrial arts, 65 percent; home arts, 39 percent; fine arts, 19 percent; agriculture, 21 percent; and nursing, 5 percent), followed by constants with variables (major and minor), unified studies and core curriculum, and provisions for slow learners and gifted. Miller (43) and Spitznas (58) argued for the use of the individual school as a unit for curriculum change, recommending the addition or removal of courses, the adjustment of direction of emphasis, and efforts toward the improvement of instruction as effective means for curriculum study. Sanford (55) posed three crucial questions to be answered: Who should be educated? What learning experiences should be provided? How should those learning experiences be provided? A number of studies were proposed as ways to give answers to these questions. Various guidelines to the secondary curriculum were developed by Douglass (18, 19). French (24) summarized the role of the American high school as being free, public, comprehensive, and designed to help all youth to attain a higher level of competence to think and act in the face of problems and situations of daily life.

General Aspects of Design

General books in curriculum paid more attention to the problem of design than in previous years. Saylor and Alexander (56) and Anderson (1) discussed the problem of design in relation to curriculum patterns now being commonly used. Douglass (18) dealt with the problem of the high-school curriculum but failed to present any over-all framework within which the work of this portion of the common school may develop. Swenson (59) in an article showed what some of the problems of this articulation are. Guidance was portrayed by Kelley (33) as one of the common denominators of curriculum organization. Fitzgerald and Fitzgerald (20) put more emphasis on methods of instruction in the various subject fields in the elementary-school curriculum than on the general problems of curriculum design.

An interesting application of a curriculum framework to the study of nursing education was made by Sand (54). This study showed the value of a theoretical rationale in any effort to improve educational programs. Unpublished doctoral theses by Bower (7) and Benthul (3) presented the role of curriculum theory in developing organizing principles for a course of study and in examining the roles of textbooks. On this last point, the study by Cronbach (17) made a contribution.

Objectives have always been considered as having an important role to play in any curriculum design, but few studies have been made of either their nature or their functions. Bloom and associates (5) made a significant attack on the classification and definition of objectives. They saw three major parts in a complete classification of objectives: the cognitive, the affective, and the manipulative or motor skill areas. Their report treated only the first in detail. Nerbovig (48), thru a series of comprehensive interviews with teachers, studied how objectives were actually used by them in dealing with their problems of teaching. On the level of the teacher, Rehage (51) examined the ways in which the teacher may obtain evidence for making instructional decisions.

The Foundation Areas and Curriculum Design

There is general acceptance of the importance of philosophy, the behavioral sciences, and the social foundations in the development of curriculum programs. Increasingly, the area of curriculum theory or design will be influenced by advances in these foundation areas.

The National Society for the Study of Education yearbook on modern philosophies and education (47) re-examined the import of philosophy for education and educational planning. Brackenbury (8), Childs (12), and Hullfish (31) developed the nature of the contribution philosophy makes to education, and the latter two authors showed how the pragmatism of Pierce, Mead, Dewey, and others provides the theoretical framework for one approach to curriculum design. Fundamentally, all curriculum decisions rest on some kind of value decision, and Champlin (11), Getzels (26), and Scheffler (57) showed the contributions of philosophy, personality development, and science to educational policy.

The reassessment of the individual, the clarification of significance of social groups, and an enlarged view of perception, communication, and problem solving are what Tyler (61) saw as some of the major areas of development in human behavior which have significance for education. Kimball (34), Brookover (10), Coladarci (14), and Haggard (27) tried to show the contributions of political science, anthropology, sociology, and learning theory to educational theory. McGuire and White (39) showed the social class influences on the educational program of the school and ably delineated the contributions the behavioral sciences can make to research in curriculum. The theoretical framework of Parsons and Skils was used by McDonald (38) to examine present curriculum theory. The major contribution of this social system to curriculum analysis seemed to be to underscore the importance of the centers for organization as being key components in any curriculum design.

Need for Research

While few of the references used in this chapter are research studies, promising trends are appearing. Careful studies of the contributions of the foundation areas to curriculum need to be combined with philosophic studies of the purpose and value of education in America. Even more important, we need exploratory and descriptive examinations of what the dimensions and subjectmatter of curriculum design really are. Promising efforts in this direction relate to the analysis and explanation of the classroom scene and of patterns of teacher-pupil interaction. Especially promising for design are the efforts to describe and analyze the operational aspects of the common curriculum problems of objectives, selection, organization, continuity, and evaluation.

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CHAPTER V

Adapting the Curriculum to the Needs, Capabilities, and Talents of Individual Students

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A BASIC concept guiding the development of modern American education has been the belief that all children and youth—with their range of differences in abilities, interests, aspirations, and experiential backgrounds—should be provided adequate and appropriate educational opportunities. Individualization of instruction is a continuing concern of teachers and other curriculum workers. The steady outpouring of literature dealing with the general problems of differentiating educational experiences tends, however, to be primarily descriptive or suggestive and contains comparatively few reports of research and experimentation. More numerous are the studies of the characteristics of and program modifications for children whose deviations are such that they are classified as exceptional children.

The expanding research interest in exceptional children is perhaps most striking in the areas of the intellectually gifted and the mentally retarded. Spurred by criticisms of the quality of educational programs and by manpower studies which underscore shortages in areas of specialized talents, research on the gifted has swelled in the past decade. And as schools have become more comprehensive in nature and increased their holding power, the problems of providing for retarded children have stimulated research. The December 1953 REVIEW OF EDUCATIONAL RESEARCH pointed out the rapid growth of interest in and provisions for exceptional children.

Differentiation of Teaching Procedures

The U. S. Office of Education (29) surveyed high schools to determine the status of adaptations for slow and rapid learners and found a variety of procedures used with no standard type of program considered best for all schools. A primary purpose of this survey was to help schools study ways to improve instruction for pupils in the highest and lowest 15 to 20 percent in general intelligence. Using essentially the same procedures, Frain (19) surveyed administrative and instructional provisions for rapid and slow learners in Catholic secondary schools. With findings similar to those of the U. S. Office of Education he concluded that differences were not so much in manner as in matter of instruction.

Phases of scope, methods, and materials of reading instruction for gifted elementary-school children were investigated by Klemm (32). The emphasis in a majority of programs was on instructional practices embodied in a developmental reading program with some guidance in outside reading and remedial help for those with problems. Flournoy (17) produced a booklet on mental arithmetic and tested it with 550 pupils in 20 intermediate classrooms. The results indicated increased ability to solve problems mentally and more general acceptance of mathematics by pupils and teachers.

The development of student scientists was studied by Brandwein (7) who proposed hypotheses concerning the factors influencing high-level ability in science. McWilliams and Brown (39) reported practices in mathematics for superior junior high-school students. Gordon (22) described the provisions for outstanding science and mathematics students as detailed in the questionnaire responses from 501 teachers. Roach (51) surveyed the secondary-school mathematics and science programs for gifted students in Indiana cities and found that 46 percent had some type of special program in mathematics and 38 percent had special provisions in science.

Surveys of Programs for Gifted Students

With resurgent concern for more adequate identification and development of gifted students have come numerous surveys of existing programs and practices. French and Skogsberg (20), and Havighurst, Stivers, and DeHaan (23) described provisions for the gifted in certain schools across the nation. Examples of surveys of provisions for the education of the gifted in California public schools include those by Bowman (6), California Elementary School Administrators Association (8), and Trimble (58). Using a questionnaire to which 55.7 percent of the high schools responded, Trimble found that the majority of California secondary schools did not make special provisions for the gifted other than what is provided thru enrichment in the regular classroom.

The ways New York City schools dealt with identification, grouping, guidance, curriculum patterns, and teaching technics for bright and gifted children were described by its Bureau of Curriculum Research (42). Donovan (13) reported the curriculum provisions and organization for education of the gifted in New York City's 54 academic high schools. He indicated that, in addition to the four special schools, eight had honor schools and 42 reported having honor classes. Kravetz (34) investigated the specific provisions made for gifted children in Los Angeles City elementary schools. Examining the educational status of 973 gifted children, he found the majority assigned to grades according to their chronological age with achievement generally above their grade placement. Stedman (56) surveyed 20 colleges and universities with respect to identification, academic programs, underachievement studies, and student personnel services for their gifted students.

Curriculum Adaptations for the Gifted

The bulk of new materials dealing with school programs for gifted students described procedures without presenting data concerning the effectiveness of these efforts. A few evaluative studies were reported, however. By means of a questionnaire to which 456 graduates of Cleveland's Major Work Program during the years 1938-1952 responded, Barbe (1) evaluated these special classes. The majority (84 percent) favored the classes with varying degrees of enthusiasm. Both male and female respondents (61 and 74 percent respectively) reported that the classes helped them in making a good adjustment. The academic performance of 23 students who entered junior high school from an enriched program in which they met in groups of eight to 10 for two 50-minute periods per week to engage in a variety of activities was compared by Dunlap (14) to that of a matched group which had not been provided similar experiences. He found that the experimental group made more effective use of their capabilities. Parker (47) reported experiments in Cedar Rapids, Iowa, schools in which the program for the elementary-school children consisted of curriculum enrichment and that for the eleventh-graders involved ability grouping for history and literature with a single teacher for two periods. Test data indicated that gifted children profited from special provisions in the two experimental programs.

Numerous methods have been used to provide for the gifted by modifying the tempo of instruction, arranging for experiences at an earlier age than normal, or decreasing the time spent on various school activities. Pressey (49) discussed basic principles and research on acceleration. Birch (2) studied 43 mentally advanced children admitted to first grade early, and Worcester (63) summarized Nebraska studies of children admitted to kindergarten approximately eight months earlier than normal. These accelerated children made satisfactory school adjustments in academic, emotional, social, and physical areas as well as or better than their later-starting peers. Justman (31) studied 95 matched pairs of Special Progress (three-year junior high-school program completed in two) and Normal Progress students in New York City high schools and found little or no difference in their academic attainments, social and personal adjustment, attitudes, or interests even tho there was a gap in their ages and years of schooling. Jones and Ortner (30) evaluated the University of Buffalo program of granting college credit by examination. Comparing the "anticipatory" group with a matched group who did not take these examinations, they found the former at no serious disadvantage, with their college grades as high and displaying greater interest in doing independent study. A study of the academic performance of veterans who were accelerated on the basis of their scores on the General Educational Development Test reported by Bledsoe (4) indicated that they performed acceptably in subsequent courses, except in the area of natural sciences. Bonsall (5) compiled the reactions of gifted high-school students to their elementary education and found that altho many felt they had been handicapped academically and socially, the majority agreed acceleration had been beneficial to them. Wilson (62) used questionnaires to find educators' opinions about acceleration of gifted students. The 749 returns from a wide sampling of school and college administrators indicated lack of agreement among the educators as to whether gifted children should be promoted sufficiently to permit college entrance by age 16 or 17.

The Fund for the Advancement of Education (21) sponsored several studies involving admission to college with advanced standing, early admission to college, and reduction of the conventional eight-year school and college program to seven. A progress report on these three projects and the Gifted Child Project of the Portland, Oregon, Public Schools appeared in 1953.

Programs and Provisions for the Mentally Retarded

A survey of the major problems affecting the education of the mentally retarded in both public day and residential schools was conducted by Cassell (10) thru an open-end questionnaire to 185 selected administrators. Shortage of trained personnel, need for greater public understanding, and inadequate classroom space and facilities were among the problems most frequently mentioned. The National Association for Retarded Children (41) reported on day classes for severely retarded children; an investigation of the types of special education programs and facilities provided by state and local communities was conducted by the New York State Mental Health Commission (46).

Blatt (3) compared the physical, personality, and academic status of mentally retarded children attending special classes with those attending regular classes and found that the retarded in both situations were less able physically and had a greater degree of personality maladjustment than typical children. Teachers of special classes appeared to have greater acceptance of the retarded than regular-class teachers. Weiner (61) studied the final academic achievement of 37 mentally handicapped boys who had been enrolled in a pre-academic program for two years, three months. The results indicated that the benefits of the pre-academic program were obtained without loss in final academic status. Snyder and De Prospo (55) found a marked growth in social maturity of mentally retarded children in a wide-age-range class during a summer demonstration program. Ingram and Popp (28) described the plan for mentally retarded in Flint, Michigan, schools and reported the children's progress during its first year of operation. The favorable results of a pilot program for trainable mentally retarded children were reported by Rosenzweig (53).

Programs for Other Exceptional Children

Much of the research dealing with exceptional children focused on their characteristics, their development, and the special problems they face. While there are valuable implications in these studies for the curriculum worker, there is a relative dearth of research dealing with tests of educational programs and provisions for exceptional children. New York City's Bureau of Educational Research (43, 44) studied the intelligence, achievement, certain aspects of behavior and adjustment, and the educational history of sixth-, seventh-, and eighth-graders with cardiac limitations and of fifth- and eighth-graders with orthopedic limitations. Using observers and checklists, the Bureau surveyed classroom practices and suggested modifications in curriculum and instruction. Enright (16) reported data describing provisions for the education of blind children in California public schools. General agreement on the success of the cerebral palsy program instituted in 1950 was reported by the Committee on Education of the Coordinating Council for Cerebral Palsy in New York City (12). The committee also surveyed schools in 29 other cities for the types of educational provisions made for children with cerebral palsy.

Hopkins, Bice, and Colton (26) described the work in the academic department of a public day school for children with cerebral palsy. A comprehensive study of 765 epileptic children and the special program provided by Detroit Public Schools was made by Tenny (57). Wallace, Slater, and Steinberg (59) described pupil progress in classes for cerebral palsy in four New York City units. Experiences over a five-month period in teaching a group of 13 emotionally disturbed boys were described in case study form by Kornberg (33).

Campbell (9) reported the value for both blind and sighted children of nonsegregated classes in Temple City, California. Teaching in the classroom was supplemented by special instruction suited to the individual child's handicap. An experiment in which 10 fourth-grade acoustically handicapped children, selected on the basis of high intelligence, were integrated with 25 hearing children was undertaken by New York City's Bureau of Educational Research (45). Altho both groups did as well as or better than would be expected of children of their ability, true integration did not occur. The social and self-perceived statuses of physically handicapped and normal children in integrated elementary classrooms were studied by Force (18). He found that the physically handicapped children long for acceptance but are not as well accepted by normal children; he concluded that psychological integration is not attained by mere presence in the classroom.

Grouping Practices in School Programs

Eales, Reed, and Wilson (15) surveyed the grouping practices in 42 secondary schools of Los Angeles County and found that 36 used some kind of ability grouping. The investigators noted a marked increase in classes for mentally retarded and, to a lesser extent, for gifted. Severson (54) studied the effects of ability grouping on a variety of factors involved in academic achievement and personal-social development of junior high-school pupils and concluded that purposeful grouping was a desirable educational practice. Holmes and Harvey (24) compared two methods of grouping, permanent and flexible, in terms of their effects on arithmetic achievement and found few significant differences in learnings or attitudes. They suggested that rather than to argue unproductively that one method is better than another, each teacher should analyze his own class and make provisions for differences in ways which will best meet his needs. Comparing the achievement of a group selected on the basis of high intelligence with another chosen on the basis of high interest in language arts, and finding that the latter exceeded the former, Lazarus (35) concluded that grouping by interest at the secondary-school level was sound. Hoover (25) examined the effects of differentiated teaching according to student ability by comparing the attainments of two classes specially grouped and seated with a third class similarly classified but not seated in groups. The first two groups increased scholastic averages, seemed to avoid being stigmatized by grouping, and displayed a greater sense of belonging when working with individuals of similar academic capacities. Ramey (50) reported that there was almost complete overlapping from one ability group to another, but that teachers tended to generalize and teach according to their perceptions of the homogeneity of the group and neglected the wide inherent ranges in any group.

Hosley (27) compared the learning outcomes of sixth-grade pupils in a school having Grades VI, VII, and VIII and those in a Kindergarten-Grade VI school and found no significant differences under these alternate organization patterns. Lorge and Mayans (36) examined the achievement of migrant Puerto Rican pupils and found that challenging them to understand in a regular classroom had marked advantages over separating them into vestibule classes both for English mastery and for personal adjustment. Mann (40) analyzed the social status of gifted children in a program of partial segregation and found that altho these children mingled with others in the report room for half the school day, they did not actually develop real friendships with their average classmates.

Promotion Practices in Schools

Wallihan (60) found no discernible evidence of improvement in reading occurring as a result of nonpromotion in primary grades. Coffield (11) conducted a longitudinal study of the effects of nonpromotion on educational achievement of pupils in the seventh grade who had repeated a grade during elementary years and found that altho there were educational gains, repetition did not bring students up to grade norms. Coffield found no significant differences in general level or variability of seventh-grade achievement between schools having high and low rates of nonpromotion. Rocchio and Kearney (52) studied the relationships between teacher-pupil attitudes as measured by the Minnesota Teacher Attitude Inventory and nonpromotion rates of high-school teachers.

Summary

Despite the relative paucity of research dealing with provisions for individual differences compared with the total volume of writings, a steady increase does seem apparent. Numerous approaches have been used. For example, the U. S. Office of Education (37, 38) in studies dealing with the qualifications and preparation of teachers of exceptional children pointed out competencies and experiences needed for proficiency in providing adequately for these children. Many kinds of research are needed at all levels, particularly in testing the effectiveness of various instructional adaptations and modifications. In the area of the gifted, for example, Passow and others (48) summarized research and literature and raised questions for consideration and research by school faculties. It is at the level of the classroom teacher and building unit that quality research is presently most needed. Because of the relative newness of special programs for all types of exceptional children, philosophy, theory, content, and procedures will have to be developed and clarified.

From the combination of accumulated literature with available research, these emphases seem to be emerging as promising trends in curriculum adaptations for individual differences: (a) acceptance by schools of the responsibility for development of exceptional children of all kinds and extension of services from preschool thru secondary level; (b) readiness to re-examine the possibilities of administrative modifications which were formerly summarily dismissed on the basis of earlier writings; (c) willingness to explore and use a variety of provisions and technics, rather than rely on a single program for all; (d) exploration of various means for integrating provisions for exceptional children into the regular program; and (e) involvement of more members of the professional staff in program development in an attempt to build sequential articulation of programs.

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CHAPTER VI

Organization for Curriculum Development

HUBERT M. EVANS

THE scope of this chapter is limited to those published studies and reports which in one way or another deal with plans, procedures, methods, and technics for carrying forward programs for curriculum development. For the most part the studies are reported in terms of staff organization, leadership problems, teacher participation, personnel training, or some combination of these important aspects of curriculum improvement. An occasional study devotes major attention to lay participation and less often, to students. Evidenced in most of the studies reviewed is a major concern for the effective organization and training of professional and lay personnel in order that certain objectives related to curriculum reform may be achieved. This continues a trend noted, among others, by Passow (36) and is reflected in recent comprehensive textbooks on the curriculum (6, 46).

Organization and Procedures for Curriculum Development

The newer patterns of organization and procedures with their emphasis on decentralization, wide participation, and a grass-roots philosophy characterize practically all systematic efforts at curriculum reform. The notion that changing the curriculum means changing people has apparently taken firm root in the thinking of educators; differences appear only in how people are to be changed. Group work under various guises and the group process are almost universally advocated as effective methods for changing people and thus the curriculum. Gold (15) advocated the group process as a means for curriculum building and laid down some guiding principles including participation and learning by doing. Thelen (51) suggested that working groups formed by voluntary action were one of the essential conditions for effective curriculum development and that evaluation should include a systematic study of the process of working together. Arguments for cooperative action on curriculum problems were advanced by Ragan (39), and Fromm (13) reported a systemwide organization of a hierarchy of groupings as a way to organize and focus efforts on curriculum reform. A thorogoing cooperative approach to curriculum planning in a large city school system was described by Adams (1) as a way to promote group thinking and mature individuality and to secure unique contributions.

Systemwide and local-school programs for curriculum improvement seem to be assuming a more or less common pattern built on group work, powered by common concerns, and steered by indigenous leadership. In many studies there is a marked sensitivity to the individual school and the teacher. French (12) stressed the importance of shifting major responsibility for curriculum development to the individual school along with the necessary initiative and autonomy. A plan for using certain teachers part time as leaders in curriculum development was reported by Redford (41). Smith (47) described the organization of one school for curriculum improvement and pointed out methods for relating it to the total school system. Prasch (38) related how one school, by means of staff committees and departmental groups, carried thru a three-year study leading to the development of a new senior high-school curriculum. Provision for substitute teachers to release regular teachers and additional compensation for work beyond normal expectations were features of a systemwide curriculum project reported by Marshall (30). Wider use of departmental chairmen in curriculum development programs was urged by Gruman (17). The always difficult task of channeling research findings into school and classroom practices was reviewed by Russell and Parker (45). They recommended that teachers be helped to gain insight into different types of research, that the staff be so organized that research influences curriculum development, that action research be encouraged, and that universities and teacher education institutions expand their inservice offerings designed to encourage research and research competence. Young (54) described how one state developed a comprehensive plan for curriculum improvement. Methods and technics employed included advisory committees, workshops, consultant services, and technical assistance to teachers and schools.

Parents and other lay citizens are often included as working participants in curriculum reform programs. A sizable portion of the Fifty-Third Yearbook of the National Society for the Study of Education (32) was devoted to lay participation in curriculum improvement with many case histories of local community effort. Rawlings (40) reported a study of teacher and student opinions of their school curriculum; the study was designed and carried out by a committee of parents, teachers, and central office personnel and subsequently led to an action program. A plan for encouraging parent participation in the solution of school problems by means of small group meetings focused on problems of immediate interest to parents was described by Lloyd (27). The creation of a parents advisory curriculum council in a systemwide project involving teachers, parents, pupils, and central office personnel was reported by Ahrens (2).

Less attention is generally paid to the evaluation of plans, procedures, and organization of curriculum reform programs than one would normally expect. Thomas (52) developed criteria for a balanced program of curriculum development and applied them systematically in a study of a small school system by means of questionnaires, interviews, direct observations, and studies of time use. Akers (3), using questionnaires and interviews, evaluated the curriculum improvement program in a suburban community and concluded that (a) greater emphasis should be placed on the scientific method of problem solving and action research, (b) increased efforts should be made to involve students, (c) a continuous attempt should be made to clarify philosophy, and (d) there should be more trained personnel available to aid teachers. Young (54) in his report of a statewide curriculum program warned that teachers should not be plunged into the solution of a curriculum problem without adequate preparation.

As an end-piece to this section we may take note of an interesting study by Harap and Merritt (19) on the status of curriculum guides and another by Nault (33) on the effectiveness of such guides. Harap and Merritt found an increase in the number of guides published in one form or another as compared with previous studies, a growing emphasis on cooperative production of guides, and a definite tendency away from prescription to suggestion. Nault determined that the larger the number of teachers involved in the preparation of curriculum materials, the greater the probability that such materials will be used in classroom teaching.

Status Leadership and Curriculum Improvement

The many-sided and complicated problem of adequate leadership for curriculum improvement programs continues to be a major concern of educators. Rehage (42) made an interim report of the activities of the Midwest Cooperative Program in Educational Administration in which he described a comprehensive study now under way focused on exploring the roles and responsibilities of status leaders. Stressing the responsibility of the superintendent for curriculum revision, Ostrander (34) defined certain characteristics which the modern school superintendent should possess in terms of abilities, insights, vision, and zeal. Emphasizing that the school principal is a key person in curriculum revision programs, Spalding (48) advocated that the school principal encourage the attitude of inquiry among his staff, provide security and recognition for those who attempt change, provide time and facilities for curriculum work, and aid in the evaluation of the consequences of any changes undertaken. Hand (18) laid down a basic strategy and tactics for principals to follow in developing a curriculum improvement program. Asserting that the secondary-school principal must ultimately be responsible for leadership in any curriculum change in his school, Broadway (8) outlined the tasks which a principal must undertake to discharge this responsibility adequately. Pinckney (37) and Robinson (43) listed methods and technics which a principal could use in developing a program for curriculum reform. The work of a curriculum commission set up by a state principals association was described by Hearn (20).

Status leaders other than principals and superintendents received attention during the period under review. Gordon and Hoppock (16) described a cooperative research workshop designed to increase the effectiveness of curriculum coordinators and supervisors. Defining action research as a technic for supervision, Taba and others (50) developed an inservice program for leadership training for those who work with teachers. Central in this program were systematic experiences with the solution of problems in school situations. The basic importance of consistency of behavior on the part of a curriculum coordinator in his relations with his co-workers was pointed out by Hetland (22). Working as a college seminar under the direction of Mackenzie (29) a graduate student group developed a report on the role of the curriculum coordinator in selected schools. Rowland (44) developed an argument for wider use of the guidance counselor in curriculum improvement. Seeking to determine the influences which produce the diversity of interpretation of the role of the curriculum director, Connolly (9) found these influences most significant: (a) the beliefs and understandings of both the director of curriculum and the superintendent as to the nature of curriculum change, (b) the effectiveness of the organization for curriculum change, (c) the attitude of the community and schoolboard toward curriculum reform, (d) the size of the school system, and (e) the recency of the establishment of the position of curriculum director.

The Teacher and Curriculum Development

No one has yet devised a plan for changing the school curriculum without trespassing on ground occupied by the classroom teacher. This being the case, it is understandable that the teacher is so frequently a central concern in studies of curriculum development. Urging that the entire faculty of a school be responsible for basic curriculum planning, Amend (5) reported the procedures developed by a high-school staff to bring about significant changes in the total curriculum. Hughes and others (24) described an action research curriculum project involving teachers working within a county framework. Cooperative decision making, maximum use of the talents of participants, and freedom to make decisions, cooperatively determined, were stated by Parton and Whitson (35) as necessary conditions for effective faculty action on curriculum problems. Self-evaluation of the school program was advocated by Lewis (26) as an approach to curriculum change. Basing evaluation on an analysis of student diaries taken at the beginning and end of the school year and on an analysis of questionnaire and inventory studies of teachers' attitudes, he found that working relations among teachers and their understanding of children were improved and that a better program of education for children was secured. Fullagar (14) reviewed some of the difficulties commonly encountered in promoting effective teacher participation in curriculum development programs, and Erickson (10) summarized the major features of an inservice program for improving the competence and versatility of classroom teachers with respect to curriculum problems. Misner (31) reviewed basic principles underlying an effective teacher-citizen cooperative attack on school problems. Hoppe (23) described ways in which students may participate in curriculum revision with the warning that to provide opportunities for students to take part in curriculum planning requires responsible response to what they say and do.

In a university seminar setting, Alexander and others (4) developed a training program for teachers and other educators based on experiences with cooperative research on actual problems in school situations. Herrick and Estvan (21) reviewed four areas of curriculum research in which the teacher should be active and went on to suggest how research procedures could be applied by the classroom teacher to curriculum problems. Pointing out the need to establish more effective working relations between the teacher and the specialist, McCuskey and Conaway (28) advocated the interdisciplinary approach to solution of curriculum problems. Fleming (11) stressed local research activities as the key to the selection of curriculum content and suggested methods by which the teacher could assess pupil academic needs, interests, attitudes, values, emotional needs, skill in critical thinking, and other relevant matters as an approach to the selection of teaching content and materials.

Teacher attitudes toward curriculum change and toward status leaders, and extent of participation are important areas for research. In a study involving 285 subjects, Jensen (25) found that teachers expected the status leaders to furnish the leadership necessary for the development of a guiding philosophy, and the same teachers indicated that they were willing to move in directions suggested by competent leadership. Stuckey (49) investigated the extent of teacher participation in a two-year curriculum study in a junior high school and found that nearly 70 percent were active in the program and the remaining teachers sympathetically kept up with what was done. Using a flexible interview technic, West (53) determined eight crucial points at which teachers and status leaders had different understandings regarding the quality of human relations in cooperative working situations. And Banning (7) in a study involving 65 junior high-school teachers found that such factors as a sensed contribution to the school program, a meaningful share in policy decisions, harmonious relationships with students, and participation in the life of the school's community were more potent in determining attitudes toward curriculum change than teaching load, subject or grade taught, or other mechanical conditions.

Summary

The contribution of the studies reviewed in this chapter to the research process or to the stock of research findings leaves something to be desired as Passow also concluded in a previous review (36). This is to be expected as the whole field of curriculum research is still in the natural history stage of development as a behavioral or social science. There is yet no clean break-thru to a firmer research base for making decisions and planning organizational operations. A substantial body of experience with curriculum problems has been accumulated, and in this sense the studies reviewed made a contribution to further progress. Worthy and necessary as they are, however, they should be viewed as an evolutionary beginning, a prelude to the major work yet to be accomplished. The exploring, the quasi-research, the soul-searching so evident in the studies reported did produce some leads, some insights, and some additional empirical evidence. But it is difficult to avoid uneasy feelings about some important matters.

A major source of uneasiness can be traced to the premises and the assumptions which underlie or give direction to many of the studies reviewed in this chapter. The doctrine of the individual school as the most efficient working unit for curriculum reform is frequently advanced. What evidence is available to support this assumption? What is the quality of the evidence advanced? To what extent is such evidence derived from rigorously controlled research situations? The line-and-staff principle of organization in curriculum change is apparently on its way out or at least in a process of considerable modification. What new principle of organization is to take its place? Are principles derived from group process ideology to take over? If so, how are these new principles to be tested for their effectiveness in giving direction to organization for curriculum reform? The statement, "To change the curriculum is to change people"—so easy to recite and so difficult to understand—is frequently argued as a valid assumption and as a necessary guide to curriculum change. What does this premise mean in operational terms? How may principles derived from this premise be tested adequately in school situations?

It is obvious that the assumptions and premises cited above are cut from the same piece of cloth. To cite the examples, however, is not to object but to point out the danger of converting a promising hypothesis or premise into a bit of educational dogma. It is not the business of educational research to add more dogma to the already overburdened educational enterprise.

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CHAPTER VII

Research and Evaluation in Curriculum Planning

ROBERT S. FLEMING

THE past few years saw a marked interest in research. A variety of materials appeared which represent attempts on the part of educators to make existing research available and to stimulate increased research activity.

Activities in the curriculum field were varied, and perhaps exceedingly slow. It is significant that the period reviewed has not produced a major national or regional curriculum research project. Coladarci, Brooks, and Odel (17), in a study of research priorities, found that administrators over the country reported marked concern over curriculum problems and indicated that they deserve priority for research.

Research in Curriculum Planning

As one analyzes recent research in curriculum planning, one sees that its most striking emphasis relates it to basic sciences which deal with human behavior. Hovet (38) indicated that curriculum research is distinctive in that it is the work of studying systematically the conditions under which changes in human behavior occur. Chase (15) suggested that research findings must be assimilated into the central nervous system of the person before they can become effective. DeLong (20) described several trends in the literature on learning that gave evidence of the acceptance of a new frame of reference in this field. The focus seemed to shift to the learner and to related patterns.

Another emerging emphasis in curriculum research related to the study of special groups of children. Passow (57) described a series of studies. The U. S. Office of Education (71) initiated as major projects studies which dealt with the mentally handicapped and with retention and continuation of students in school. Such studies are of marked interest and relate directly to problems of grouping which urgently need systematic inquiry.

A growing development in curriculum research related to the participation of teachers in the research process. There appeared to be emerging in the literature "case studies" of efforts to improve. Beach (9), Parkin (56), Helfant (35), and others reported that teachers tried out scores of practices and made efforts to use such activities for modifying their work. Hand (33) and Johnson, Sanford, and Hand (40) dealt with ways of organizing for curriculum improvement. They sought answers to local-school problems thru cooperative efforts by teachers, parents, pupils, and others. Traxler (68) stated that research must become a part of education rather than be carried out *for* education. *Group Studies in the Elementary Grades of the Ohio State University School* (54) described work of the elementary-school faculty of the University School at Ohio State University. Perkins (58) discussed teacher participation in descriptive research. A plea was made by Carpenter (14) for more descriptive research in education to include both materials and phenomena under investigation.

Research itself was helpful in pointing to curriculum change. Russell and Parker (63) indicated that significant findings in many areas contribute to curriculum change, including research on learning, working with groups, instructional materials, and other topics. Fleming (26) described a variety of procedures which might provide evidence for the selection of curriculum content. Many of the procedures were used to identify problems of individuals and communities. Raths (59) analyzed the role of evaluation in research design. Rehage (60) extended this idea by placing emphasis on "evidence" as a basis for making instructional decisions. Such evidence comes from data about students, data about the community, characteristics of the general culture in which young people are to live, bodies of knowledge upon which the school plans its program, and from knowledge regarding the conditions under which learning occurs.

Illustrative of efforts made to enable teachers to use research was the work of Hansen (34) in which practical methods of collecting and using evidence were described. Bebell (10) related the research process to teaching. Alexander and others (1) described a series of examples of studies teachers made as they secured help in university seminars.

Impressive work was carried out during the past few years in focusing research on the teaching of specific subject fields. Perhaps the most extensive of these was the publication of the Association for Supervision and Curriculum Development, *Research Helps in Teaching the Language Arts* (6).

A series of publications prepared by the American Educational Research Association had a similar focus. These bulletins appeared under the series title, "What Research Says to the Teacher." Barnard's *Teaching High-School Science* (7) is illustrative. Others appeared in various subject areas. One issue of this REVIEW (2) was devoted to a review of research which included much material on research important in curriculum planning. The new yearbook of the National Society for the Study of Education, *Social Studies in the Elementary School* (52), related the social studies to the current social scene, to knowledge about children and how they learn, and to evaluation as well as to the role of the social studies in the total elementary-school program.

Action Research

A case seems to be emerging to support the generalization that the unique trend in curriculum research of the past few years emphasizes research for school improvement. Moore and Stendler (50) made a thoughtful analysis of action research. By way of criticism they suggested that evidence obtained from action research tends to be scanty and unreliable, that action research assumes that we have answers to most of the questions, and that problems of perception and motivation are oversimplified.

The study of Foshay and others (27) illustrated the way in which teachers adapt research methods to classroom use. Mackenzie and Corey (47) described a cooperative study carried on in Denver; emphasis was placed on improving the effectiveness of leadership. Brandt and Perkins (12) summarized a series of studies carried out by the Institute for Child Study under Prescott's direction. Hughes and others (39) reported on a cooperative action research study carried out in a systemwide manner in Utah. Barnes (8) illustrated an action study of a different type in the writing of textbook materials describing local resources and history.

In Anderson's opinion action research (3) was the single most significant development as a technic for curriculum improvement in the last decade. He also gave attention to the "impotency" of curriculum research and to the characteristics of action research.

A unique feature of the 1957 Yearbook of the Association for Supervision and Curriculum Development was the "Bibliography on Curriculum Research" prepared by Larson (44). This unusual bibliography is illustrative of attempts to stimulate and assist teachers and curriculum workers with a research approach to school improvement.

Recent activities in the curriculum field tend to place increasing emphasis on human relations as a vital factor in curriculum improvement. Miles and Corey (48) related human relations factors to institutional dynamics. The authors examined a series of organizational roles and their effects on research as well as on internal problems faced by research groups. Miles and Passow (49) developed a concept of training which seeks to produce skills needed for inservice education of teachers.

Evaluation Contributes to Research and School Improvement

Inherent in the process of curriculum research is a functional conception of evaluation. Doubtless, efforts to separate curriculum research and evaluation are futile. The past few years brought a variety of articles and reports in which the process of evaluation was considered. The 1954 Yearbook of the Association for Supervision and Curriculum Development (4) devoted a chapter to the role of evaluation in the learning environment. A conception of evaluation is illustrated and described in which evaluation becomes an active process associated with valuing, clarifying purposes, and hypothesis making, carried on in a cooperative, continuous manner. Fleck (25) developed a similar concept and focused it upon a re-examination of present practices. A provocative chapter by Herrick (36) in a current yearbook described the nature of the evaluative process and applied it to changes in inservice education. Wright (72) summarized 80 unpublished studies of core programs; several of the studies dealt with evaluation.

An optimistic note was the continued emphasis on the need for clarification of educational goals which are basic to the evaluation process. Shaftel (64) made the point that as we are able to share specialists from other fields with teachers, we generate even better educational goals. Herrick and Estvan (37) stated four problems in the area of educational objectives and suggested ways of studying the latter. Gates (30) reported that a shift occurred in objectives; they were related less to individual subjects and more to the total school program. Future studies will no doubt explore this shift and concentrate on the learning process and on deeper motivations that affect the learning of children and youth. Tyler (70) focused attention on the ways a school accomplishes its purposes, indicating that appraisal both of process and product is necessary if improvement in evaluation is to occur. Devitt (21) emphasized that the process of evaluation should be focused on school improvement.

A major trend was the increasing number of evaluations of school-wide programs. Typical of many efforts in this area was the work of Lewis (45) in Minneapolis which placed major emphasis on the uses of self-evaluation as a basis for curriculum improvement.

A case study in evaluation is included in the Fifty-Sixth Yearbook of the National Society for the Study of Education (52) in which the social studies program of the Denver city schools was described (53). Otto (55) devoted a chapter to "Evaluation of Social Learning" in which interesting technics were described for measuring aspects of social development.

The work of the Southern Association of Colleges and Secondary Schools continued to focus attention on a cooperative approach in school evaluation. *Looking at Your School* (65) attempted to assist a local faculty in the use of a systematic plan for evaluating the elementary school.

Perhaps one of the most urgent needs in the entire area of evaluation is for the clarification of ways of describing pupil progress. The use of the Carnegie unit is also a part of this problem. Tompkins and Gaumnitz (66) discussed the status of the Carnegie unit; the study illustrated the clear-cut relationship between evaluation, curriculum accreditation, and secondary school-college articulation.

Besides increasing attention to educational programs, there were other important developments in evaluation. Brueckner and Bond (13) placed emphasis on specific procedures teachers can use in diagnosing learning difficulties. According to Findley (24) trends in the measurement of achievement suggested that tests were being used increasingly to measure growth and development rather than status and that emphasis was being placed on application of knowledge and the evaluation of problem solving. Traxler (69) and Hall (32) pointed toward the use of tests in planning differentiated instruction.

Interestingly enough, DeLong (19) found behavior of children during testing different from their behavior in the classroom at other times. Ludeman (46) suggested a re-examination of testing and evaluation practices. Travis and Umstattd (67) advocated a cooperative approach in which students and teachers share in planning and evaluation. Diederich (22) cautioned professional workers concerning pitfalls in the measurement of achievement and suggested the necessity of norms for gains as well as for status. Kooker and Williams (42) pointed to the need for more efficient evaluation rather than for rigid standards.

Mouton, Blake, and Fruchter (51) found that certain sociometric measures are reliable and merit more intensive analysis as a basis for predicting performance. Krugman (43) recommended increased use of projective technics.

One of the unique developments in new tests was the *Sequential Tests of Educational Progress* (23) developed by the Educational Testing Service. Critical skills in the application of learning are measured from the fourth grade thru the sophomore year of college.

The topic of reporting pupil progress continues to occupy a prominent place in educational literature. Rothney (62) developed a simple analysis of research in the area. His attention to new reporting procedures needed gave some direction to future research. *Reporting Is Communicating* (5) was issued by the Association for Supervision and Curriculum Development; emphasis was given to guiding principles in reporting pupil progress and to specific procedures for collecting needed evidence about children. Gabbard and Lewis (29) analyzed material from 70 school systems; here again the concept of communicating with parents was emphasized. Roelfs (61) developed an extensive list of trends in reporting practices in junior high schools.

Research on promotion continued, as illustrated by Coffield and Blommers (16) and Goodlad (31). By and large it appears that retention in a grade does not result in increased performance and that, in general, children should be promoted.

During recent years statewide testing programs were revised, possibly in part because the expanding conception of school objectives emphasized the limited uses of test results. Accompanying this trend was a growing emphasis on statewide programs of evaluation and curriculum improvement, as described by Frick and Moorer (28) and Berdie (11).

One of the most interesting developments was that of systemwide evaluation. Davis (18) and Kennedy (41) reported on this work. The Southern Association of Colleges and Secondary Schools sponsored a series of studies in which all schools in a system participated. Interestingly enough, these studies were based on efforts within a system to bring about improvement. Essentially, this then creates a setting for local criteria to emerge and for the major concern to be that of bringing about continued improvement.

Summary

There seems to be limited systematic inquiry on vital problems and issues. There is almost a frightening scarcity of research in curriculum. There are important gaps in recent literature dealing with curriculum theory. We still have few examples and studies of valuing, thinking, and creativity. We still need case studies on ways of translating a pupil's problems and needs into curriculum experiences.

The philosophical concept of action research seems sound, yet there appears to be little evidence in the literature of actual accounts of such work and appraisals of effectiveness. Altho the tendency for teachers to participate in research activities should be encouraged, leaders must make sure that systematic, careful, objective procedures are used. Extensive evaluations of such efforts must be carried on. Efforts at inservice education must not be confused with research. New relationships among colleges, state departments of education, and school systems should be clarified.

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INTRODUCTION

This issue more nearly resembles the parallel issue in the 1951 cycle than its predecessor of 1954. Whereas the latter was devoted to a review of statistical developments, the former attempted to review developments in research methodology generally. However, we have set ourselves an additional task. Specifically this issue attempts to:

1. Take note of the significant literature published in the intervening period since the last Review coverage of certain familiar areas of research methodology
2. Introduce new topics of immediate or potential importance to those engaged in educational research work.

This latter goal is exemplified in the issue's first chapter. This discussion of the philosophy of science was included to point up the importance of the field's developments for the model building and theorizing upon which the future progress of much of educational research so heavily depends. Another example is Chapter II on cross-cultural methods. It spotlights a method which some workers believe holds the key to an interdisciplinary approach to some of education's important problems, and it emphasizes the "science" aspect of the "social sciences." Still another example is Chapter IX. The electronic calculator has become more than a slave to do routine problems. It opens up new avenues of research and makes practical the use of research methods which were formerly given but fleeting attention because they were too complex and cumbersome.

The original design of the issue called for a chapter to continue the excellent discussion of decision theory in the December 1954 issue of the Review. While several authors expressed considerable faith that in the future exciting and valuable developments would stem from this area of investigation, they agreed that it was too early to re-examine this field.

The problem of facilitating the use of research results has become almost as crucial as that of developing new research findings. Chapter X discusses one method of attacking this problem, action research, and points to an important weakness in conventional research methodology to which some attention should be given.

The organization of this issue roughly corresponds to the time sequence in which questions might present themselves in the research process: (a) a philosophical consideration of the research process and the function of models (Chapter I); (b) the consideration of the various research methods, the choice of technics, and the design of the experiment (Chapter II thru the Status Studies of Chapter IV); (c) the consideration of various research tools to develop problem treatment (the "sampling" part of Chapter IV thru Chapter VIII); (d) data processing (Chapter IX); and (e) use of results (Chapter X).

The increased scope of this issue has forced even greater emphasis on the Review's traditional policy of being selective rather than comprehensive in its bibliographic coverage. While this is specifically noted in the introductions of certain chapters, it is true of nearly all of them. In this field of the REVIEW's cycle increasing pressure for selection comes both from the intensive development of existing technics and from the continued addition of new ones. Consideration should be given in forthcoming numbers to attempting more regular and intensive coverage of a limited field on alternate cycles (e.g., the December 1954 REVIEW) and/or depending more heavily on other issues in the cycle to help complete coverage.

To some extent this latter policy is already in effect. While the unity of educational knowledge is such that probably no REVIEW issue finds the borders covered solely within its pages, this area is especially fortunate in that help is obtained from several parts of the cycle. For instance, test methodology and measurement theory are covered in more detail in the REVIEW of February 1956. Similarly the issue, "Human Relations and Programs of Action," of October 1953 supplements several chapters in this number. The June 1956 REVIEW, "Twenty-Five Years of Educational Research," contains an excellent chapter, "Methods of Research," with a splendid book bibliography. The February 1957 issue of the REVIEW summarizes educational research in countries outside the United States and notes advances in research methodology where they exist in that literature. Finally, our parallel issue in the previous cycle, "Statistical Methodology in Educational Research," published in December 1954, is an excellent intensive review of one facet of the research methodologies field, and is far from outdated.

We hope that readers will find our coverage of familiar topics more than adequate and that the review of additional areas will contribute significantly to the improvement of educational research.

DAVID R. KRATHWOHL, *Chairman*
Committee on Methodology of
Educational Research

CHAPTER I

The Philosophy of Science and Educational Research

MAY BRODBECK*

Scientists do science. They formulate concepts with which to describe the facts they find. They look for laws connecting some of these facts with others. They try to formulate theories in order to explain known facts and laws and to help find new ones.

Philosophers of science talk about science. They try to clarify the nature of scientific concepts, laws, and theories. How do concepts acquire meaning? What is the logical form of a law and of a theory? What is the meaning of explanation in science? Of causality? What is a model? Is there any connection between scientific description and the values scientists hold? These are some of the more general questions philosophers of science try to answer. They may also analyze the concepts, laws, and theories of specific sciences like physics, psychology, or biology. Thus, the logical structure of relativity theory in physics or the difference between vitalism and mechanism in biology might be such special issues engaging the attention of philosophers of science. The enterprise is clarificatory. It seeks neither new factual knowledge nor new technics but, by logical analysis, clarification of the knowledge and methods we have.

Occasionally, this analysis implies a criticism of some of the things scientists say about what they do. Sometimes this criticism is helpful to the working scientist and contributes to greater achievement. In any case, clarity and understanding never do any harm.

The less well-developed a science is, the more germane will be the general analyses of philosophy of science. Physicists may perhaps be spared a lesson in how to formulate precise, meaningful concepts. Social scientists can still profit from such lessons. Educational research is part of the less-developed social and psychological sciences. I shall, therefore, concentrate on recent analyses by philosophers of science of some more general problems of meaning and explanation in science.

Operationism

What is the *principle* of proper concept formation in science? This question is fundamental, for the kind of answer given determines also the answers to many other questions such as those about the nature of causality and of induction. In common sense, the meaning of a term referring to a physical object, like a dog or a chair, is given by listing the observable attributes of these objects, like barking and shape. But science is not concerned with the meaning of physical-object terms. It takes these for granted as given by common sense. Its concern is with terms referring to rather more *abstract* properties of physical objects. The characteristic abstractness of scientific concepts, like mass or IQ, lies in the fact that these terms cannot be defined by simply listing a cluster of directly observable attributes. Merely by looking at a surface we can tell whether it is red or by looking at an object whether it is a dog. We cannot so simply tell what the mass of an object or the IQ of a child is. Yet, we must know what to look for in order to tell whether statements that an object has a given mass or a child a certain IQ are true or false. How then are these scientific words to be defined?

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* This paper was written during the tenure of a Faculty Research Fellowship from the Social Science Research Council. The author is indebted to the Council for the time thus granted.

Operationism answered this question by making explicit what had been customary practice within physical science for generations. It pointed out that scientific terms must be defined, not in isolation as in a dictionary, but by stating the observable conditions under which a sentence containing the term is true or false. More specifically, an operational definition has the form of a conditional or *if-then* sentence. The antecedent or *if* clause of this sentence states the test or stimulus conditions or what must be done in order to make certain observations. The consequent clause states the truth or response conditions or what must be observed after the test conditions have been imposed. In the case of quantitative concepts, these test conditions consist of certain measuring procedures or *operations* such as weighing on a balance or giving an examination. The truth conditions state what must be observed after these operations or manipulations have been carried out. Terms referring to personality traits, attitudes, and abilities must clearly also be defined in terms of behavior that is exhibited under certain conditions. All terms, whether quantitative or not, requiring the if-then form of definition may be called *dispositional* concepts (3). An operational definition, like any other definition, is a statement about the use of words, stating how one term may be eliminated by means of others. Like any other definition, it is thus purely verbal or tautological.

Criticisms

Once a heroic rallying cry in the behavior sciences, operationism is now everyday good scientific practice there as elsewhere. It is not a special philosophical or methodological position. It merely clarifies the form definitions of scientific concepts must take in order to determine when statements containing these terms are true or false. As the study of man came of age scientifically, it inevitably adopted the practice of defining its terms. In fact, the practice is a necessary condition for such coming of age. Yet this modest proposal for forming empirically meaningful concepts, dignified by the title, *operationism*, has had its critics.

There has always been criticism from the right, that is, from sources essentially hostile to a science of behavior. Life and space are too short for more than one brief comment on these last-ditch defenders of lost causes. Their essentially antiscientific plaint is to the effect that definition, operational or otherwise, deprives science of the rich halo of meanings surrounding terms in ordinary use. So it does, and so it should. The scientist may draw upon this halo for hunches about laws, but if he wants objective knowledge of behavior, he cannot carry over the vagueness of ordinary usage into his technical vocabulary. Or so it would seem. Yet rather early in the game, operational definitions were attacked as unduly restrictive by sources undeniably favorable to a science of behavior (11, 14, 15). Since operational definitions are, after all, just definitions, it is not surprising that, in fact, the strictures were generalized to embrace the whole principle of empiricism that concepts to be meaningful must be defined in terms of observable properties of things. Instead of the narrow criterion of definability, it was urged that the meaning of a term must be left *open.* This openness is gradually filled in, tho never closed, as we increase our knowledge. Or, as it is also put, the meaning of a term is given not explicitly by definition, but implicitly by the set of laws or theory in which the term occurs.

Explicit Definition and the Nomological Network

What are the arguments for and the merits of the view that meaning cannot be given by explicit definition?

There are several different ways of measuring the length of an object, hunger in a laboratory animal, or the IQ of a child. If the meaning of a term is given explicitly by its definition, all these different antecedent measuring conditions result in different definitions for length, hunger, or IQ. Yet we may have good reason for believing, or even just *feel,* that these all measure the same thing. Moreover, we may continue to devise new test conditions for the presence or absence of the property in question. Any definition by means of a single test condition for the presence and absence of an attribute, therefore, fails to capture the full meaning of the term. And since we are always adding to the list, the meaning of a concept is never more than partially determined. The group of alternative criteria for the application of the term does not, therefore, literally define it. The unending list of test and truth conditions does not permit the elimination of the term. Accordingly, it is said to be *reduced* to, rather than defined by, the set of if-then sentences about the conditions when the term is applicable. The latter, in turn, are called *reduction sentences* and only partially specify the meaning of the term (11, 14).

Definability was thus liberalized into *reducibility.* The latter countenanced, if it did not advocate, terminological indefiniteness. It is perhaps not surprising that empirical reference was soon to be drowned in a sea of context. Consider certain clinical and social concepts, like anxiety or group morale. What kinds of observable behavior shall constitute the definition of such terms? Answers to a test may give a high anxiety score. But people with identical scores also exhibit many different varieties of behavior. To really know what *anxiety* means, it seems reasonable to say that one must know not merely the test scores but all the characteristics predictable on the basis of them. Such concepts, according to the most lucid exposition of this view (12), are postulated attributes or *constructs* which are *reflected*, but not defined, by the test performance and all other behaviors positively correlated with it. Their full meaning is given by the set of laws in which they occur.

This set of laws is called a *nomological network*. The more incomplete the network, that is, the less we know, the vaguer are our concepts. Until we know all the laws in which a term occurs, we do not know precisely what it means. It is only partially defined. After we have all the laws, the term is implicitly defined by this network. Reverberating in this doctrine is an echo of the arch-rationalist Hegel. A denial that terms have referential, noncontextual meaning is the essence of Hegel's coherence theory of knowledge. Does the nomological network disguise in empiricist trappings a resurgence of the old idealistic metaphysics? In any case, the extreme view (18) that *no* term has meaning apart from a system of laws is not generally embraced by the critics of definition. The anti-empiricist implications of a view which bases meaning wholly on context at the expense of extrasystematic descriptive reference are too potent. The view is unpalatable both to the scientist who tries to describe the world and to the philosopher who tries to show how the scientist accomplishes this. Its more moderate advocates grant that some of the terms of the network are definable in terms of observable events (10, 12). Those which allegedly are not thus definable are held to be connected to these by chains of laws. They are thus *partially coordinated* to the realm of experience.

Logical and philosophical technicalities apart, this is the gist of the arguments against explicit definitions. To some, they are convincing. Others find them irremediably confused (3, 4). In particular, the formula that "the meaning of a concept is the set of laws in which it occurs" is charged with confusing issues of fact with those of meaning. This confusion is abetted by an ambiguity in the term *meaning*.

Meaning and Significance

In one sense of that word, *meaning* is something we give to a concept when introducing it for the first time. It is what we agree to call a certain attribute or cluster of attributes. Thus it is purely verbal or, as one says, a matter of convention that *dog* refers to a barking rather than to a meowing creature. On the other hand, the generalization or law that "dogs are carnivorous" is a matter of fact and not a matter of the way we use words. Yet, on the nomological-network view, meat eating is part of the meaning of the concept dog. As we know more about dogs, we expand the meaning of the concept.

To be sure, in one sense of meaning, a concept is more meaningful to us the more we know about it. But what is the *it* about which we know more and more? This can be answered only by distinguishing between two different meanings of *meaning* (2, 3). One of these is the empirical referent for which the term is introduced. This is purely verbal. The other refers to the set of laws in which a term occurs. This is an empirical matter. The word *significance* has been suggested for the latter. A term may have meaning without significance, but not conversely. Can we not add the new things we find out about something to its definition, thus giving more meaning to the term? Up to a point, we can. Suppose that the results of three different tests for intelligence are found to be concomitantly connected. *Intelligence* is now redefined, so that it means not any one of these test results, but all three together. The term has been redefined to keep up with our knowledge, but what has been gained by doing so?

Suppose *intelligence* now means a certain level of vocabulary, arithmetic ability, and general information, or, perhaps, something presumed common to all three, like linguistic ability. Yet, in order to be able to predict that an individual with high vocabulary is also good at arithmetic, we would still have to state separately the empirical law connecting these attributes. So nothing has been gained by packing everything we know into the meaning of the term. Suppose it happens that *status* as initially defined in one way and *intelligence* as defined in another are found to be connected. Do we want to coin a new word whose meaning will include both the referent of status and that of intelligence?

This is the logical conclusion to which the notion of partial definition carries us. Yet it leads nowhere. Without independently asserting the empirical law connecting status with intelligence, the new concept is just a word for a cluster of characteristics. Without the statement of the law, we have no justification for stating that members of this cluster uniformly occur together. Nothing follows from definition or meaning alone. Only from laws can we make predictions.

Furthermore, how could we have discovered that intelligence is connected with status unless these terms have independent meaning? Again, *what* is it that we have knowledge *about?* In other words, in order to discover the significance of a term, we must first know its meaning. Significance alone will never give us empirical science. If the system of laws is to be about the word—if it is to be a factual, descriptive system—its concepts must also have meaning in the sense of designation or reference.

Nor can laws intelligibly be said to implicitly define their terms. The term *implicit definition* is a most misleading manner of speaking (8). If it makes sense at all, it makes sense only when one is speaking of the axioms of a formal system, that is, a system of marks on paper containing expressions like "X and Y," to whose letter variables no meanings have been attached. For such a system, the axioms implicitly define its terms only in the sense that, showing structure tho no content, they delimit the range of possible meanings or the interpretations that can be given to the symbols of the system if true statements are to result. Replacing the letter variables by some empirical concepts gives true sentences. When replaced by others, the resulting sentences will be false. But there may be many alternative sets of empirical terms which will give either result.

The term makes no sense when, as in empirical science, our system contains not uninterpreted letter variables but empirical concepts, theoretical or otherwise.

What of the technic of partial interpretation, or of partially coordinating so-called theoretical constructs to terms that do name observables? This procedure was suggested by the example of atomic and subatomic physics, the only place in physical science where terms are introduced in this way. But it is the axiomatic system in which these atomic notions are embedded which is partially coordinated, not the atomic concepts themselves. Some of the terms of this axiomatic system are coordinated to those of another system, like thermodynamics, all of whose terms are empirically defined. On the other hand, some of the terms, like *electron* and *mass of electron*, are not coordinated at all. They do not have partial empirical meaning. In this very special sense, they have no empirical meaning at all. The situation is a very special one indeed (3).

The uncompleted network of behavioral laws in which the theoretical terms occur will presumably come to include terms referring either to further behaviors, or to neurophysiological, chemical, or other such events. In any case, these other terms would, if they were not leaning on each other in the curious circular manner of the nomological network, refer to observable attributes. No matter which way you look at it, the behavioral scientist's candidates for theoretical constructs, like *hostility*, *aggression*, *morale*, and the like, must have *some* referential meaning. If, on the one hand, meaning is confounded with significance and the meanings of these terms are given by the laws in which they occur, then for there to *be* any laws, these terms must have independent meaning. On the other hand, if these terms have no independent meaning, their connection to observables can be only verbal or definitional. Their empirical meaning is then given by this definition, which may, of course, be changed.

Definitions, being merely verbal, are tautologies. Laws are empirical statements. If the latter are absorbed into the former, if everything is made a matter of meaning, we have not an empirical science but a structure of tautologies. This would make nonsense of the whole enterprise. How then does one come to hold this view? Practically speaking, behavioral scientists often cannot define their terms precisely. The precise definition of social attitudes or clinical states requires one to choose from an almost infinite variety of *symptoms* those which can be used reliably to define the term in question (8, 9). The list of behaviors which together enable prediction to other behaviors cannot yet be sharply terminated. Such terms thus have a fringe of vagueness or *openness*. To achieve greater reliability and significance, such terms are frequently redefined to include new factors or, for that matter, to drop out old ones. Loosely speaking, we say the original definition was only partial. Accurately speaking, we frequently abandon our definitions and propose new ones. The initial vagueness and consequent frequent redefinition is part of the hit-and-miss way a science progresses. But the logic of science is concerned with the *principle* for good concept formation. The psychology of discovery is something else again. The purposes of neither science nor logical analysis are served by exalting the exigencies of research in a difficult area into a methodological principle.

Causation

What is the difference between a *true* and a *spurious* correlation? What is the difference between a causal connection and a merely *accidental* conjunction of events? Despite immediate appearance to the contrary, these are not quite the same questions. Researchers accustomed to working with statistical correlations have developed technics for distinguishing the true from the spurious correlation. A high correlation, for instance, between female marital status and job absenteeism is said to be true, while that between marital status and candy consumption is called spurious. In the latter case, the introduction of an additional factor, age, leads us to abandon the original correlation. In the true case, on the other hand, the introduction of an additional factor, increased housework, is said to confirm the correlation. Why, in each case, do we treat the original correlations differently after introducing the additional factor?

After all, marriage is statistically correlated with age, thus also with candy eating. Statistically, therefore, in both cases there actually is a correlation and both are *explained* by the third factor. Married people eat less candy because they are older; married women are absent more from jobs because they have more housework. We justify saying that nevertheless the former correlation is spurious and the latter is true, because we analyze the notion of a true correlation in terms of a presumed causal connection. Getting married causes more housework, which in turn causes increased absenteeism, so getting married is truly correlated with absenteeism. Getting older, on the other hand, is a common cause both of marriage and eating less candy. All concomitants of age, like grey hair and paunchiness, would give a high correlation with eating less candy, if age does. They have a common cause, but are not causes of each other. Thus, the difference between true and spurious correlations resolves into a difference between causal and noncausal connections.

Nor does the difference between causal and noncausal conjunctions arise only for statistical correlations. Nonstatistical generalizations, asserting for all things of a certain kind that they are uniformly connected with something else, also raise the same problem. "All gases expand when heated" states a true causal connection, while "All the books on my desk are blue" does not. Philosophers have puzzled about how to distinguish the truly causal connections from those which are merely accidental. In particular, it has been pointed out that the usual formulation of an empirical law as an if-then statement does not reveal this distinction. Both the real law and the accidental conjunction would each be expressed as conditional statements. If anything is a book on my desk, it is blue; if anything is a heated gas, it expands. The conditional states the observed constant conjunction to these characteristics.

The analysis of statements like "A causes B" into statements about a uniform conjunction of events, without using the term *cause*, has been, ever since David Hume, basic empiricist doctrine. This analysis follows from the empiricist criterion of meaning, of which operationism is merely an application. All that we observe is the constant conjunction of the events "A" and "B" and not a third thing called a cause.

Idiomatically, we may distinguish between accidental and causal connections by using the subjunctive mood. If this gas were heated, it would expand. On the other hand, if a book in the bookcase were on my desk, it need not be blue. It has, therefore, been suggested that only by means of the subjunctive can we distinguish lawful connections from mere generalizations (13, 17). "A causes B" or "If A then B" is an empirical law only if we can truly assert the corresponding subjunctive, "If anything *were* A, then it *would be* B." To put it differently, if the corresponding subjunctive is true, then we have a real connection, otherwise only an accidental generalization. This seems a rather neat solution. Unfortunately, it has some obvious difficulties.

How are we to *know* the truth or falsity of the corresponding subjunctive? Fundamentally, there are only two alternatives. One is that we know it by inductive generalization from observation. But we observe only that whenever we have A, we also have B. The subjunctive, therefore, can be asserted only on the basis of prior knowledge of the indicative conditional. But then the subjunctive is superfluous since the evidence for it is no different from the evidence for the corresponding indicative conditional. The alternative is that we know the truth of the subjunctive in some special way. The empirical evidence for both the causal connection or true empirical law and the accidental conjunction is never more than a finite number of instances. There are thus no observations distinguishing the truth of the subjunctive from that of the indicative form. If, therefore, the subjunctive says more than the corresponding indicative and if this excess meaning is not further analyzable, we must know it in some special way.

We must somehow grasp or see that one subjunctive is true while another is false. On the empiricist analysis, a law of nature is expressed by the indicative if-then form. Rejection of this analysis leads us down the path of rationalistic intuition or reason. I mentioned before that one's principle of proper concept formation or criterion of meaning was fundamental. We see now why this is so. On the unanalyzable subjunctive view of empirical laws, we are, in effect, back to an unanalyzed notion of cause and to rejection of the empiricist criterion of referential meaning. Inductive generalization gives way to intuitive grasp of real connections. Is this really the price we must pay for the ability to distinguish between lawful and accidental uniformities? Clearly, this is a distinction we should like to be able to make. Fortunately, this can be done without sacrificing empiricist views on meaning and knowledge. But the distinction cannot be made simply by considering generalizations by themselves, in isolation (3, 6, 7, 20).

The difference between a law and an accidental conjunction of events is a matter of fact and not of meaning. For matters of fact, it is reasonable to point out that we must look at the context, that is, at the rest of what we know. Let us reanalyze the difference between the spurious correlation between female marital status and candy consumption and the true correlation between female marital status and absenteeism. Why in this latter case does an additional factor, increased housework, confirm the correlation? The answer can be given without the use of cause. Introducing the third factor, more housework, leads to two new generalizations: When a woman marries, she has more housework, and if housework increases, so does absenteeism. From these two generalizations, the correlation in question between marriage and absenteeism follows as a deductive consequence. It is thus explained by them, in the only precise meaning *explanation* has in science. Because we can explain the correlation by deducing it from other generalizations, we consider it to be a true one. On the other hand, in the spurious case, the additional factor, age, does not permit such deduction or explanation. Again we have two new generalizations, namely, age correlates with marriage and age correlates with candy consumption. But from *these* two generalizations, all that logically follows is that age is correlated both with marriage and with candy consumption. We cannot derive the correlation between marriage and candy consumption. When we define *explain* precisely, we see that the new factor, age, does not explain the correlation. That is why it is abandoned as spurious.

Theories

A theory is a deductively connected set of generalizations. A generalization is a law if it is part of a theoretical structure. The generalizations serving as premises are laws because they permit the derivation, hence the prediction and explanation of other laws. If a generalization either predicts or is predicted by other laws, the evidence for it is more than the mere conjunction of its observed instances. It is for this reason that we state firmly that if a gas were heated, it would expand. We assert the subjunctive because the law about the expansion of gases is not due to mere enumeration of instances. On the other hand, neither is it due to any unanalyzable connection between temperature and expansion. Rather, we believe this to be more than a mere conjunction because it is part of the theory of thermodynamics. It both implies and is implied by many other highly confirmed statements. Until we know more about how an isolated correlation is connected with other facts and generalizations, we cannot tell whether it is true or spurious, to use the statistical jargon. The decision about whether we have a law or an accidental conjunction thus depends upon further empirical knowledge and is not a matter of intuitive insight of grasp of real connections among things.

Models

The recent literature of behavioral research is replete with *models*. The time is clearly more than ripe for a thoro logical analysis of their nature and function. Yet, such attention as philosophers of science have recently given to models is disappointing. Except for one highly technical treatment (6), philosophical discussions, like those of scientists themselves, are rather more hortatory than clarificatory. Models, we are assured, are the "core of discoveries" (19). How, and in what sense, are they the core? Beyond reiterating that they provide a way of conceiving or thinking of phenomena, a way of speaking (16, 19), no real clues are offered to the logical connections between the model and the theory for which it is a model. Nor are we told precisely how it is that models help us explain, beyond apparently providing a feeling of familiarity. Optics, we are reminded, uses a geometrical model. It deals with optical phenomena by the use of geometrical pictures. But what exactly is the connection between geometry and the physics of light rays? Are the pictures and diagrams really an essential part of the model? How, *in general*, can the laws of one area, like geometry or physiology, be a model for the laws of another area, like optics or psychology respectively? Is the term *model* always used in the same way? How do models differ from theories? Questions like these and many more must be answered, if we are to understand the nature and function of models.

The fact is that the term *model* is used most ambiguously. Nor is *mathematical model* any more precise since this term, too, covers different things. Broadly speaking, there are two major uses of *model*. The most general use is as a synonym for theory. A scientific theory is a deductively connected set of laws or generalizations, some of which, the axioms, logically imply others, the theorems. A theory may be well or ill confirmed, narrow or broad in scope, quantified or nonquantified. *Model* is now frequently used for those theories which are either highly speculative or quantified, or, most likely, both. Thus, a guess about the connections between quantified variables of an area, like psychology or economics, will frequently be called a mathematical model. Such hypotheses are mathematical only in the sense in which physics is mathematical. That is, they are empirical generalizations whose variables are quantified, so that we can say how much one variable changes with changes in others. They share the virtue of all quantified theories in permitting more precise deduction and prediction.

Quantification, however, is no guarantee of scope. In areas where behavior depends upon many different variables, we may indeed pay for quantification with triviality. But then, nonquantified guesses at theories, like the doctrines of psychoanalysis or speculations about the physiological concomitants of behavior (which are often broader than quantified theories but lack their precision) are also frequently called models. Such speculative theories, whether quantified or not, are after all just theories. The term *model* serves no particular purpose beyond, perhaps, emphasizing the tentative, unconfirmed nature of the hypotheses in question. This usage would be harmless enough if it were not the case, as it unfortunately is, that there is another, quite different prevalent use of the term.

Isomorphism

Strictly speaking, I should have said two further uses (9). For in this second meaning of the term two different things are really involved tho they have a common feature. This feature I shall now explain. A miniature train is a model of a real train if it is isomorphic with it. Isomorphism requires two conditions. First, there must be a one-to-one correspondence between the elements of the model and the elements of the thing of which it is the model. For every chimney stack, there is a miniature chimney stack; every window has its replica, and conversely. Second, certain relations are preserved. For instance, if a door is to the left of a window in the original, their replicas are similarly situated; also, the model is constructed to scale. If the model works on the same principle as the original—if, for instance, a model steam engine is also steam propelled—the isomorphism is complete. Extending this notion to theories, a precise meaning of *model* may be formulated. The form of a law is given either by the verbal if-then formulation or by an equation. If, for example, weight is a linear function of height and if supply is a linear function of demand, then these laws have the same form tho different content. The content is given by the empirical terms. Two theories whose laws have the same form are isomorphic or structurally similar to each other.

If the laws of one theory have the same form as the laws of another theory, one may be said to be a model for the other. This is the second most general meaning of the term. The laws of one area may suggest hypotheses about the form of laws in another area. The notion of *model* as isomorphism of laws is obviously symmetrical. However, when an area about which we already know a good deal is used to suggest laws for an area about which little is known, the familiar area providing the form of the laws may be called a model for the new area. Thus, the biological theory of evolution may be used as a model for social theory. Servomechanisms, like the automatic pilot or thermostat, are now frequently evoked models for learning and purposive behavior.

Testing Models

How does one test these suggested models? First, it must be possible to state clearly what is in one-to-one correspondence with what. Organisms grow; that is, they increase in size and weight. What is *social* growth? Relatively precise meaning can be given to adaptive and nonadaptive characteristics of organisms within evolutionary theory. Can we give correspondingly precise meanings to these notions for human institutions? Once clearly defined empirical concepts are made to correspond to the terms of the model, structural similarities, if any, are sought. Nutrition is connected with growth in biology. Are the social concepts corresponding to nutrition and to growth similarly connected? In other words, not only must the terms of the two areas correspond, but the connections between them must also be preserved if the model is to be of any use. An area, either part or all of it, can be a fruitful model for another only if corresponding concepts can be found and if at least some of the laws connecting the concepts of the model also can be shown to connect their corresponding concepts.

Arithmetical Models

Replacing all the empirical, descriptive concepts in the theory of one area by those of a different area results in another theory with the same form but content different from the original. The isomorphic sets of laws, those of the model and of its *translation*, are both empirical theories whose truth or falsity depends upon the facts. It is possible, and often highly desirable, to establish another kind of isomorphism, in which the result is not two empirical theories sharing a common structure. Instead, the laws, or some of them, of an empirical theory may have the same form as a set of purely arithmetical truths. If this is the case, the latter is called an *arithmetical representation* of the empirical theory. *Mathematical model* sometimes means just this sort of arithmetical representation of an empirical theory. The laws of arithmetic, rather than those of another empirical theory, may be used as a model when, for instance, it is desired to rank or measure the variables of an area. If, like the integers, the empirical terms of an area obey the axioms of order, they may be ranked. For instance, one of these axioms states the transitivity of the arithmetical relation, *greater than*, among integers. This means that if one number is greater than a second and the second is greater than a third, the first number is also greater than the third. Replace the integers by names of individual people; replace the arithmetical relation, *greater than*, by the empirical relation, *smarter than*. If the statement resulting from this translation is true, the empirical relation of one person being smarter than another is transitive. If, in addition to this axiom, *smarter than* also satisfies the other axioms of order, individuals may be ranked by this relation.

If the variables of an area are quantified and obey not only the axioms of order but also further axioms for the addition of integers, measurement is also possible (1, 5). Measurable descriptive properties are those having the same structure as the addition of numbers. The measurability of descriptive properties is expressed by a set of empirical laws which are isomorphic to the laws of arithmetic. By virtue of this isomorphism, numbers may be assigned to the properties of things, resulting in quantified empirical laws. Other parts of arithmetic serving as models for empirical properties are, for example, probability theory and the theory of games (9). A correspondence is established between the empirical concepts and those of the arithmetical theory.

Whether or not true empirical laws result from this correspondence depends upon the facts. Many properties are not transitive and thus cannot be ranked. Many properties are nonadditive and thus cannot be measured. If, however, the empirical variables do share the same structure as the laws of arithmetic, all the arithmetic theorems can be used to make deductions from these quantified laws to other laws and facts. When a model, either empirical or arithmetical, is used as a source of hypotheses about the connections among the variables of another area, it does not explain these hypotheses. It merely suggests their form. If, however, these new hypotheses are confirmed, they may be used to explain and predict new knowledge.

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CHAPTER II

Research Methods: The Cross-Cultural Method

GEORGE W. GOETHALS and JOHN W. M. WHITING

A GOOD method, to paraphrase Guthrie, is at best a tool by which explanation is furthered. In the final analysis a theory or method stands or falls upon its utility. The cross-cultural method presents a number of paradoxes which the reader must keep in mind as he considers it as a possible tool for research. First, altho the method has been in existence for some 70 years, not until recently has either its scope or its usefulness been recognized. Second, unlike many areas of research, there are relatively few studies which have been published utilizing this particular method. An evaluation of a methodology usually is based upon a large amount of published research which the reviewer can refer to and evaluate. Such is not the case with this particular method. However, despite the paucity of published research this particular method has had a great effect upon behavioral science, and in relation to recent work may have shown itself to be the most sensitive methodology available for those who wish to accomplish interdisciplinary research in the behavioral sciences. Since this is the first article dealing with the method in the REVIEW, some recapitulation of its history is appropriate. This is particularly true since the cross-cultural method is often confused with another valuable approach to the study of behavior, namely, the comparative or culture-personality study.

Historical Background and General Discussion

To gain perspective, it is interesting from a historical point of view to note that this method antedates the birth in 1912 of modern psychology as delimited by Woodworth (44) and Boring (7) and the advent of modern clinical psychology usually identified as beginning with the work of Binet in 1895 (33). The cross-cultural method can best be understood if two facts are kept in mind. First, since the first study by Tylor (37) in 1889, this has been a method employing statistical technics *to test theory*. Second, while the cross-cultural method in recent times has been concerned with matters of personality development in different cultures, it differs markedly from the comparative study because of its insistence upon testing theoretical positions.

The work of Honigmann (18), Kardiner (20), Kardiner and others (21), Mead (27), Mead and Metraux (28), and Hallowell (14), while generally highly sophisticated in its approach to the investigation of theoretical problems, has in common one dimension which clearly separates it from cross-cultural research. This is that these comparative studies consistently concern themselves with determining whether a particular hypothesis, derived from some segment of theoretical insight, can be fitted into some more general cultural framework. The implication of such a technic is that the investigator accepts without question the particular theory under discussion and is exemplifying it upon a broader canvas. The few quantitative facets of such studies which do exist have to do almost entirely with determinations of normative or modal behavior.

The cross-cultural method, on the other hand, is always concerned with the test of some theory. Generally it uses quantitative technics described by Stephenson (36) as "R methodology," and further, these are in keeping with designs derived from the thinking of Fisher (10). Very simply, these technics are concerned with testing the significance of some form of correlation. If this difference is kept in mind at the start, much of the confusion between the two technics will be avoided. Those who are interested in detailed analyses of the difference between these two useful approaches are referred to work by Allinsmith and Goethals (1), Lewis (24), McClelland (25), Murdock (30), Whiting (39), and Whiting and Child (40).

Cross-Cultural Studies Testing Aspects of Evolutionary Theory

The first cross-cultural study was read at a meeting of the Anthropological Institute of Great Britain, presided over by Sir Francis Galton. This was a research by Tylor (37) investigating the development of laws of marriage and descent. The study was concerned with testing constructs derived from the theory of evolution. In 1915 Hobhouse, Wheeler, and Ginsberg (16) completed a study testing hypotheses which predicted relationships between certain social institutions and stages of economic development. After another lapse of 25 years Simmons (34) and Murdock (29) investigated other constructs relating to kinship derived from evolutionary theory. These studies are important in that their sophistication and use of newer statistical technics foreshadowed later studies.

Cross-Cultural Studies Testing Behavioral Theory

During the past 20 years there has been growing interest in the interdisciplinary responsibility for developing a general science of behavior, as evidenced by attempts to bring together the most profitable and rigorous ideas from the fields of anthropology, psychoanalysis, and experimental psychology. One of the best reviews of such efforts was presented by Allport (2). One of the first to see the possibilities of this rich body of theory was Ford (11, 12). His study of human reproduction, because of his normative treatment, is not in the strictest sense of the word a cross-cultural research; however, his methods of arriving at ratings of various behaviors in different cultures have been used in one way or another by all succeeding cross-cultural researchers (13).

Within the limits of our definition, that is that a cross-cultural study must test some hypothesis, the first study testing behavioral theory was that of Horton (19). He employed the cross-cultural method to investigate the relationship between the drinking of alcoholic beverages and anxiety. His findings revealed that alcohol reduced inhibition in all societies unless specific measures were taken to prevent it. Other researches followed; the most complex was Murdock's fascinating work (30), published in 1949, which tested many hypotheses concerning kinship terminology and its relation to such phenomena as forms of marriage, descent, and social structure generally.

Whiting's early study (38) reporting the relationship between sorcery and social control is of great historical importance. The steps that Whiting took in constructing her research foreshadowed the more sophisticated methodology which was to become part of later studies, and at the same time attempted to answer some of the original criticisms of the method. First Whiting, on the basis of her field work with the Paiute Indians and from behavioral theory in general, derived a number of hypotheses having to do with the function of sorcery as a means of social control. Once these hypotheses were stated, the next step was to examine the same variables in a number of other cultures and to test to see if they had the same relationship they had had in the original single culture. One of the important aspects of the study was that she tried to rate independently the variables under consideration and thus to make sure that any relationship between them was a result of a theoretical interaction rather than rater bias (42). She also undertook to control the geographical distribution of her sample of culture so that her findings could not be attributed to cultural diffusion. This progression from the single case to testing hypotheses derived therefrom, with reference to a sample of cultures, and then controlling for the contamination of the findings as a result of geographical concentration reveals the eventual design of later cross-cultural studies.

Behavioral theory has given rise to a number of studies all marked by their richness and rigor. Barry (5) tested the relationship between the education of the child and art forms. Wright (45) demonstrated the relationship between the content of myths and education as these both relate to aggression. McClelland and Friedman (26) demonstrated the relationship between certain child-training variables and need achievement. Finally, in 1953 Whiting and Child (40) showed the relationship between various technics of education and the development of super-ego and other manifestations of personality.

As provocative as these early studies have been, they only hint at the limitless possibilities of the cross-cultural method. The methodology did not come of age until recently; this was not possible until certain flaws in the technics were rectified.

The Problem of Data

Whiting and Child (40) in their elaborate study relating socialization pressure in different societies to facets of adult personality, described precisely how data are collected and utilized in any cross-cultural study. Despite this lucid description it is interesting that most of the criticisms of the cross-cultural method have been focused not so much upon the method itself, as upon the data various investigators have used. This criticism evolves from two preoccupations, one within and one outside the discipline of anthropology. Both of these dimensions are of concern and demand attention. Within anthropology, Spiro (35) and Kluckhohn (22) pointed out that the report of the field worker upon any given culture is no little affected by his conceptions of what anthropology as a science includes. Any given individual thus views a culture in terms of his background and training, and unless these are constant, any report of what is seen is open to the widest amount of variation. Criticisms by Lewis (24) and by Henry (15) concern a matter general to any investigation of behavior and relate to the control that can be introduced into any field investigation.

There is no doubt that these observations have some validity; criticism of the use of ethnographic sources written at different times by people with a variety of backgrounds and personal predilections is a telling one. As a criticism, however, it would be far more serious if the practitioners of the cross-cultural method had shown themselves to be unaware of this difficulty and even more important had done nothing to remedy it. Many of the reservations concerning the cross-cultural method can be put into proper perspective when it is realized that no group has been more aware of the limitations of their data than those who have employed the method.

Obviously, ethnographies already in existence cannot be completely rewritten. However, such materials can be brought up to date in relation to a strict set of criteria. The publication in 1950 of the *Outline of Cultural Materials* (31) by the Human Relations Area Files provided a method of organizing the materials and for correcting some of the deficiencies which exist. The introduction to the *Outline* provides the person working in an applied field, such as education, an excellent overview not only of the processing of data but also of its application to everyday problems.

However, the best possible way to answer the criticisms brought forward both by anthropologists and behavioral scientists in general was to undertake a program which answered both kinds of criticisms, that is, provide training so that a group of anthropologists could collect field data in the same way and provide training in the use of the method *before* going into the field. Investigators for three universities, Cornell, Harvard, and Yale, financed by grants from the Ford Foundation and the Social Science Research Council, have jointly since 1952 undertaken this dual task. From 1952 until 1954, teams were trained before going into the field to undertake an investigation of socialization in five different cultures: in New England, Okinawa, Mexico, the Philippines, and in a Hindu culture. These field teams returned in 1955 and since that time have been analyzing the data collected under these carefully controlled and comparable conditions. The critics of the cross-cultural method will find most of their objections answered by a perusal of the field manual which specifies in detail the variables of the research and their method of measurement (43).

The universality of the method is naturally its recommendation, and the kinds of observations made are consistent with one of the most intensive studies ever done on socialization in American culture (32). These studies of the five different cultures will be published within the next few years and will exemplify the cross-cultural method at its newer level of sophistication.

Recent Changes in Scope and Method

As these new safeguards relating to existent data and the collection of new information were being undertaken, cross-cultural researches began to go forward into new areas. Hollenberg (17) and Faigin (9) tested a number of hypotheses relating to technics of education and the development of the super-ego from a sample of three cultures in the Southwest. In this study, as in the comparative study of values in five cultures directed by Florence Kluckhohn, John Roberts, and Evon Vogt of Harvard University, the methodology is modeled on that used in conjunction with ethnographic literature but has been broadened to include field research. The approach is not the same as the elaborate collaboration previously described, but it, too, has the advantage of increasing the comparability of data and at the same time testing and retesting hypotheses based upon individual differences in dissimilar cultural settings.

Another advance of the cross-cultural method within the scope of ethnographic materials is exemplified by the work of Ayres (4), Anthony (3), and Whiting, Kluckhohn, and Anthony (41). Essentially these studies are concerned with the interaction of various sets of variables rather than with a strict antecedent-consequent relationship between two variables. Ayres, for example, was concerned with the relationship between pregnancy taboos, family structure, and dietary regulations. Anthony was concerned with showing how initiation ceremonies were related both to child training practices and to aspects of the kinship organization of various cultures.

The way Anthony went about his study is as important for this new kind of research as the steps Beatrice Whiting took in her study of sorcery. Anthony began with a construct from psychoanalytic theory discussed at some length by Bettelheim (6), who observed that certain cultures put young males thru extremely painful initiation rites before permitting them the status of men. Usually these are related to some painful operation involving the genitals, and typically the ordeal involves public circumcision without anesthesia. The behavioral scientist refuses to admit that such a traumatic event exists for capricious reasons. Bettelheim had seen this "symbolic wound" as being a way both to introduce the young male to adulthood and to control his access to women before maturity. Anthony proceeded to test this hypothesis and found that there was indeed a striking relationship between the *rite de passage* and the social organization of the group in which it took place. Unexpectedly, however, he found some important relationships between kinship, education, and the forms of marriage. The tendency of a good cross-cultural research to generate new hypotheses is thus exemplified in Anthony's research.

Whiting and Kluckhohn, drawing upon the work by Anthony, showed the intricate relationship between ceremonies of initiation and many aspects of the social milieu which exists around them. Most important to the field of education is the light shed upon the variations in the intensity of the adolescent revolt, a phenomenon that is shown to be widespread. The ways in which other societies cope with this dilemma can help us gain new perspectives on the problems of juvenile delinquency and the modes of transition from childhood to adulthood.

Implications of the Cross-Cultural Method for Educational Research

The advantages of the cross-cultural method to the field of education are at least two: First and foremost it forces upon education the realization that there is a broad range of methods by which a child can be brought up. At the same time it shows that these different methods are neither chaotic nor "primitive" as some of the earlier reports of "strange happenings in the South Seas" would have indicated. Instead, child-rearing methods are functionally bound in a meaningful way to other parts of the life plan of the society. Polygamous societies, for example, and monogamous societies such as our own, have been shown to differ systematically in their methods of bringing up children. Further, these differences are not arbitrary or capricious but are consistent with findings derived from the current development of behavioral science which is the theoretical framework of modern cross-cultural research. The second advantage to understanding the cross-cultural method is that above all else it causes us to be aware both of the virtues and of the limitations of the untrained observer, and much more important, it offers us ways of training people to look at the phenomena of behavior with a strategy of reason, logic, and objectivity.

Such training and such perspective are important for education now as never before. Education in this country is committed not only to training the mind but essentially to socializing the person. The school faces problems involving the emotions not only of the individual child, but also of groups of children as they come together. The field of education can no longer afford the luxury of being "culture bound." It must accept, instead, the responsibility of knowing the best there is in research so that the new responsibilities before it may be accepted intelligently and thoughtfully. The authors are not suggesting, nor do they mean to imply, that the cross-cultural method is an answer to every research problem in education. They are suggesting, instead, that by seeing the evolution of this particular method and the painful steps thru which it progressed, others now concerned with constructing a methodology adequate to the complexities of education may, by a review of what has been done in this area, avoid some mistakes thru knowing of the experiences of others. Finally, by seeing this progression, the educator may come to agree with Cumming and Cumming (8) that there is nothing more practical in an applied field than the possession of good theoretical research.

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CHAPTER III

Research Methods: Experimental Design

JULIAN C. STANLEY

IN HIS chapter three years ago, Kogan (41) illustrated a variety of experimental designs by referring to 52 studies. My initial selected bibliography contained 214 items, the seemingly most pertinent 83 of which are reported here.[1] I neither repeat any of Kogan's references nor cover material summarized by Gardner (30) and Moses (54) in their excellent chapters.

Current Trends

Modern experimental design is less than half a century old. Its grandfather was William Gossett ("Student"); its very active father, Sir Ronald Fisher; its bible, Fisher's *The Design of Experiments* (27). Recently two competitors, decision theory and information theory, have risen to challenge the supremacy of the analysis of variance and covariance. Fisher (28:69) spoke out against "the attempt to reinterpret the common tests of significance used in scientific research as though they constituted some kind of acceptance procedure and led to 'decisions' in Wald's sense. . . ." Pearson (59) and Neyman (55) replied to some of his criticisms. Cochran (15) stated that it would be unduly restrictive and harmful to view the function of statistics wholly in terms of decision making.

In a technical paper, Lindley (45) suggested that altho undoubtedly one reason for experimenting is to reach decisions, another is to gain knowledge about the state of nature in the information-theory sense of Shannon. He introduced a measure of the information that an experiment provides and formulated a rule of experimentation: Perform that experiment for which the expected gain in information is greatest and continue experimenting until a predesignated amount of information is attained.

Garner and McGill (31) compared uncertainty analysis, following Shannon, with a two-way nonorthogonal analysis of variance and concluded that while the two are similar in many respects, uncertainty analysis should be used when the criterion variable has the properties of Stevens' nominal or ordinal scale, while the analysis of variance must be employed when one desires to retain information about the metric and conditions for an interval or ratio scale are met. Frequently it may be desirable to do both analyses and compare the results.

Box (5:975) recorded his opinion that "outside the field of agriculture the sequential situation is by far the most common one." Altho the mathematical statistics of sequential experimentation have proved formidable, Grundy, Healy, and Rees (32) presented a solution for a simple version of the two-stage experiment: After the first experiment the researcher decides whether or not he needs to perform a second experiment whose extent depends upon the results of the first. Johnson (38) utilized sequential procedures to discriminate between two hypotheses about the ratio of variance components in a simple one-way classification. Ray (61) published tables for sequential tests applicable to the one-way classification and randomized blocks.

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[1] A partially annotated mimeographed list of the other 131 may be obtained free from the author while his supply lasts.

In a clear, explicit, heuristic article, Box (4) proposed a method of process improvement to be run in the normal course of production by plant personnel themselves, whereby industrial processes regularly yield information on how the product can be improved. Educators might be repaid amply for time spent pondering the applications of Box's concepts to educational "products."

Fundamental Books

Cochran and Cox (16) expanded their 1950 edition by 36 percent to cover recent developments. This expository handbook of designs is invaluable to the experimenter who already has a year or so of background in statistics. Snedecor's revision (67) should be quite helpful to educators who can translate agricultural examples into the jargon of their own areas. Davies (22) edited a large volume that, despite its title, has much relevant material; principles of experimental design are widely applicable. Likewise, the contributions of Bennett and Franklin (3), who devoted 280 pages to the analysis of variance and design of experiments, transcend the chemical industry. Perhaps Federer (24) tried to cover too much without presenting designs plans except in his examples, thereby making his treatment overly concise and difficult for most educational workers. Finney (25) wrote clearly but abbreviated excessively, providing little detailed help with computations. Ostle (57) included chapters on the analysis of variance and covariance and experimental design. A second edition of the Wishart and Sanders (82) manual appeared.

Pearson and Hartley (60) tabled percentage points of the F distribution for the .25, .10, .05, .025, .01, .005, and .001 levels of significance and for the largest variance ratio, besides providing many other useful statistics.

Applied Books

McNemar (48) expanded his coverage of the design and analysis of experiments, especially with respect to statistical models. Cornell's fresh new approach (19) merits adequate tryouts in one-year sequences; this book is a long step ahead of the usual textbook in educational statistics, but its sections on the analysis of variance demand supplementation along lines suggested by Stanley. A similar warning applies with even greater force to

Guilford's revision (33). The chapter by Edwards (23) sets forth elementary principles of experimental design.

Brunswik's "representative design" (9) bears a certain resemblance to recent work on random factors and variance components (20, 64, 81) and therefore might be pursued profitably in those terms.

Primarily Expository Articles

Baker (1) described a systematic method for arranging and analyzing the results of factorial experiments that gives the mean square relating to each degree of freedom. It is applicable either to qualitative or to quantitative factors and is especially suitable for use with a desk calculator. Stanley (70) emphasized the importance of design, stressed random assignment, and outlined the planning of two classroom experiments. Cochran (14) commented about what may well have been the largest experiment ever conducted, listing important factors in the polio field trials. Stanley (73) showed in detail how to analyze scores from counterbalanced examinations, explaining Latin and Greco-Latin square crossover designs. Campbell (11) set forth clearly and systematically considerations of group control design, with special attention to the role of pretests.

Four Basic Articles

Four long, well-written, clarifying articles of great importance to experimenters, tho probably not easy reading for most educators, deserve careful study. Scheffé (64) surveyed the current state of the theory of alternative models in the analysis of variance, showing (on page 259) expected values of mean squares for the mixed model with dependent interactions. His results agree with those of other recent investigators (20, 81) but not with certain earlier recommendations. McNemar (48:309), for instance, included in his expected mean square for the random effect in a mixed model an interaction component of variance that Scheffé omits, thereby leading the former to a more conservative test of significance for the random effect.

Cornfield and Tukey (20) dealt with average (expected) values of mean squares for several types of factorial designs, stating that they are absolutely essential to the choice of an error term—tho not sufficient, of course—and found that the customary expected mean squares (64: 259; 81: 963) resulted from their derivations under very general assumptions. Thus it may make sense for Hoyt (35) and others to talk in terms of variance components (or rather, of intraclass correlation) for dichotomously scored test items.

Wilk and Kempthorne (81) continued their contributions to the analysis of variance, defining experimental units as "those entities in an experiment to which treatments are assigned at random" (page 951) and suggesting that the term be extended to include periods of time, states of mind, and other poorly defined complexes of conditions. They stressed the need for random sampling of "levels" of a factor when the experimenter wants to generalize to all levels, just as one samples randomly from a population of experimental units if he wants to generalize beyond the experimental units actually employed in the experiment. Wilk and Kempthorne showed how unit-treatment interactions enter into expectations of mean squares, pointing out that if the number of experimental units in the population of experimental units is large, the bias caused by such interactions will be small.

We have long needed a thoro, authoritative treatment of the Latin square design. Wilk and Kempthorne (80) couched this in relatively easy language and symbolism, presented finite-model expectations of mean squares from which EMS's for the other models can be derived quickly, and concluded that analyses of variance for Latin square designs may overestimate the error term for treatment comparisons and underestimate the component of variance due to treatment main effects. Nevertheless, when both the Latin square and the randomized block designs are reasonable for a proposed experiment, they recommend the former, tho with caution, because its error term for the treatment mean square will usually be too large.

Experimenters owe a debt of gratitude to Scheffé, Cornfield and Tukey, and Wilk and Kempthorne for the care they took to make these articles intelligible to the reader whose mathematics walks with a limp.

Other Articles Concerning Expectations of Mean Squares

In a note (71) and a review (19) Stanley listed and discussed expectations of mean squares for finite, fixed, random, and mixed models, explicitly for two- and three-way crossed classifications with equal numbers of replicates per treatment combination. Extensions to one and to four or more classifications can be made quickly on the basis of principles outlined. Johnson and Stanley (39) exhibited the EMS's for a mixed-model design involving two independent groups of boys, every one of whom responded to 16 projective cards into which were incorporated three dichotomous factors, each level of which was represented twice: $2(2 \times 2 \times 2) = 16$. They showed how randomization at several points in their investigation was essential to the analysis employed. Medley, Mitzel, and Doi (49) provided EMS's for the three-way design without replication tho not via the finite-model EMS's.

Designs

Technical journals, such as *Biometrics*, *Biometrika*, and *Sankhyā*, abound with papers extending old experimental designs and proposing new ones.

The interested reader is referred to these journals and to Cochran and Cox (16). Only a few articles of this type will be cited here.

Zelen (83) explained at a reasonable elementary level his new method for analyzing data from incomplete block designs. Stanley (72) showed that Gellerman's study was more complex than its author supposed, constituting a sort of split-plot crossover design, and explained how to analyze it. Stanley (69) used scores from two forms of a "satisfaction" inventory to compare crossover and noncrossover designs. Pearce (58) studied local versus remote effects of various treatments applied to different parts of the same organism. Morrison (53) illustrated several designs with at least five factors that make possible the testing of all main effects and two-factor interactions while requiring only half the number of observations of an analogous factorial design. Clarke (12) indicated how four 4 x 4 Greco-Latin squares might be used together to provide enough degrees of freedom for error. Stanley (73) dealt with completely permuted 3 x 3 Greco-Latin square designs. Collier and Stunkard (17) treated the same type of design as Stanley and Beeman (74) tho quite differently.

Components of Variance, Pooling Procedures, and Power

Tukey (77, 78) tackled variance components with a new mathematical procedure. Bulmer (10) gave a simple, reasonably accurate formula for the confidence limits of variance components. Searle (65) employed matrix methods to find sampling variances of estimates of components of variance and covariance for a one-way classification with unequal numbers of observations in the various classes. King (40) recommended that in one-way classifications of a random factor, the number of levels of the factor equal the number of observations per level in order to give nearly maximum power for testing the null hypothesis. Johnson's study (38) has already been cited.

Huntsberger (36) showed that a certain weighting procedure provides greater control over disturbances that might result from pooling sums of squares to secure an error term with greater degrees of freedom than does the familiar sometimes-pool method. Bozivich, Bancroft, and Hartley (8) examined critically for some random and mixed models the consequences, with regard to resulting errors of the first and second kind, of certain pooling procedures. They provided two qualified recommendations, concluding that "no rule of the form $V_2/V_1 >$ constant is very satisfactory" (page 1040).

Nicholson's formula (56) for the power of the analysis of variance test holds when the denominator of the F ratio has an even number of degrees of freedom. Fox's extensive charts (29) with a detailed example should be useful. Commins (18) published a table stating the size of sample needed for various assumed values of population parameters and for four probabilities that the study will yield significant results.

A Posteriori Comparisons of Means

Stanley (68) illustrated the "post-mortem" methods of Scheffé, Tukey, Dunnett, and Duncan for comparing various differences among means after an analysis of variance has been performed. Wallace (79) presented Tukey's unpublished procedure, with applications and comments. Kramer (42, 43) extended Duncan's multiple range test to include group means with unequal numbers of replications, adjusted means with heterogeneous variances and covariances, covariance analysis, incomplete block designs, lattices, and other situations.

Applications of the Analysis of Variance to Tests

Hoyt (35) generalized to test items not scored dichotomously his analysis of variance procedure for securing coefficients of equivalence. His result is algebraically equivalent to Cronbach's alpha. Stanley commented on this procedure in his review (19). Moonan (50, 51, 52) showed how to ascertain the equivalence and stability of examinations and the interaction of items with methods in an experiment, using an orthogonal linear transformation due to Nandi.

Nonparametric Approaches to the Analysis of Variance

That current darling of psychologists, nonparametric statistics, is treated in Chapter VI of this issue, except as applied to the analysis of variance.

Roy and Mitra (62: 374) attempted to make a clear distinction between a "variate" and a "way of classification" in order to differentiate between a "multivariate analysis" situation, an "analysis of variance" situation, and "something of a mixed type." Hodges and Lehmann (34) found that the asymptotic Pitman efficiency of the Kruskal-Wallace rank test when compared with the *F*-test never falls below .864. They then investigated alternative notions of asymptotic efficiency.

Sutcliffe (75) showed how to partition sums of squares and associated degrees of freedom for complex contingency tables of frequency data from multiple classification designs, quite analogously to the analysis of variance. It is interesting to compare this method with the Garner-McGill uncertainty analysis (31) based upon information theory.

McNemar (47) analyzed seven sets of data both by the analysis of variance and Kellogg V. Wilson's method, which is similar to Sutcliffe's but less general, to show that the latter has considerably less power. One might add that with Wilson's partitioning of chi-square the interaction term may be negative.

The upshot of this seems to be that while nonparametric analogues of the analysis of variance are valuable for frequency data, one must be careful not to throw out the baby with the dirty bath water in the interests of simplifying computations.

The Analysis of Covariance

In an important paper, Cox (21) compared covariance analysis with blocking (matching with respect to a covariable) and concluded that methods based upon covariance are preferable to blocking only if the r between the covariate (x) and the dependent variate (y) is at least .6. But if we suspect that the treatment *effects* are not independent of x—that there is a treatment by x interaction—we should ordinarily prefer to use x quantitatively.

Truitt and Smith (76) examined methods for making covariance adjustments in split-plot experiments and testing main effects for significance. We have already mentioned the work of Kramer (42) and Searle (65).

Pairing

Jackson and Fleckenstein (37) compared the Thurstone-Mosteller, Scheffé, Bradley-Terry, and Gulliksen methods for analyzing data based upon paired comparisons, concluding that while all four procedures give about the same results, each has advantages for certain situations.

For both the fixed and the mixed models, Lev and Kinder (44) offered analysis of variance formulas applicable to a group of several subjects observed in the presence of each of the other subjects of the group, the entire set of possible pairings having been repeated on several occasions. Runkel, Smith, and Newcomb (63) presented a method for computing the interaction effects on variables measured by observing interacting pairs of persons, where not all possible pairs of subjects need be observed.

Miscellaneous

In a long, technical article, Box and Hunter (7) continued the development of "Boxism," introducing the concept of the "variance function" for an experimental design and defining "rotable designs." Cochran (13) discussed combining estimates from several experiments and gave examples.

Box and Andersen (6) found that while the analysis of variance test for groups of equal size is both remarkably "robust" (insensitive to extraneous factors not being tested) and "powerful" (sensitive to the specific factors being tested), Bartlett's test for the homogeneity of a set of variances is affected drastically by departures from mesokurtosis. For 20 variances based upon 9 *d.f.* each, Bartlett's test yields a significance level of .718 when kurtosis is 2, instead of the "correct" .05 value! For kurtosis of –1 the corresponding figure is .000004. The authors applied permutation theory to the problem of comparing variances to secure a robust test.

Fisher (26) warned against choosing one transformation of data in preference to another because of computational ease without considering how well it conforms to theoretical considerations.

Smith (66) stepped in to resolve the long-standing discussion in *Biometrics* about whether the missing plot estimate should be considered simply a number to be placed in the empty space or an estimate of the lost observation. He pointed out that the standard error to be attached to the estimate depends upon what one intended *a priori* to estimate.

Articles on graphic methods by Barnes, Pearson, and Reiss (2) and Lyle (46) are well worth perusing.

Concluding Remarks

Many of the contributions to experimental design during the past three years should be incorporated rapidly into statistics textbooks designed for students in education and psychology. Authors of such books need the ability and willingness to translate into simpler but still accurate form relevant material published by mathematical statisticians. Then by studying for at least a year, and preferably longer, under a well-qualified instructor, graduate students may come to understand the rudiments of experimental design. To do less than this and still hope for properly designed experiments is asking for a miracle.

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CHAPTER IV

Research Methods: Status Studies and Sample Surveys

ROSEDITH SITGREAVES and HERBERT SOLOMON

The many technical articles published in recent years on the theory and methodology of sample surveys and the rise in the number of status studies demonstrate the need for a separate chapter on these subjects. In this connection, it is appropriate to mention that Cornell (16) also prepared a separate chapter on this increasingly important area in a previous Review. Altho, as indicated in the earlier chapter, the theory and practice of sample surveys developed in other fields, education will obviously be one of the biggest users of the method as a research tool. For example, the recent large foundation grants for research in almost all aspects of education usually demand status studies to determine the present position of education in our culture and so provide a basis for comparison and future evaluation.

The major impetus for status studies, and the consequent attention to technics of sample surveys, has been and still is the need for vital statistics which can be used for social research and the determination of public policy. The report on the evaluation of Salk polio vaccine (96), the earlier Kinsey report, and the ever current election straw polls have made the general newspaper-reading public aware of sample survey technics and have indicated the growing need for more statistical sophistication in students in education and social research. It is interesting to note that the sampling design used in the 1954 field trial evaluation of Salk polio vaccine contained flaws similar to those reported by Student (76) in his assessment of the sampling design for the Lanarkshire milk experiment of 1930 (a large-scale status study to contrast the effects of raw milk and pasteurized milk on the heights and weights of elementary-school children in Scotland). An evaluation of the design of the polio vaccine field trials was presented by Brownlee (9), and sampling problems in the Kinsey reports were discussed (37). A rather recent use of the results of sample surveys has been their introduction as legal evidence in judicial decisions. Deming (21) discussed some of the problems involved in these situations.

For purposes of exposition, status studies can be artificially classified into two divisions according to goals. One goal can be illustrated by the operations of United States Government agencies in doing status studies on many national social and economic characteristics for the purpose of collecting and publishing vital statistics. The results of these status studies are then available for government, industry, labor, educational groups, and others to be used as aids in policy making. The fact that some of these studies have become routine operations in no way indicates that the associated sampling design and nonsampling problems have been conquered. A second purpose of status studies is best illustrated by the aforementioned

Salk vaccine evaluation trials. Here a specific goal is in mind before the experimentation begins, and the design is prepared for this one effort.

No matter which goal prevails, the methodological problems are basically the same. Usually some nonsampling restrictions to fit a specific situation are placed on a random sampling mechanism. The most elementary situation of this type is known as stratified random sampling. Other designs, such as systematic sampling, cluster sampling, and multistage sampling, are now described and developed in several texts. Some of these texts by Sukhatme (78) and Hyman (33) have appeared. Chapters on sample design and analysis can also be found in compendiums of technics for social research such as that by Young (100).

A number of papers on theoretical design and assessment have been published and are discussed below. Much of the emphasis in these papers has been on the preparation of a sampling design which minimizes the variability of an estimate, or the cost of a survey, or both. In addition, papers concerned with sampling problems in "dynamic studies," that is, measurements of a trait over time, and papers concerned with measurement problems related to responses to questionnaires and inventories, are beginning to appear. In the main, the present chapter reports on papers published since the middle of 1954, but it also contains some earlier articles of interest.

Status Studies

The U. S. Bureau of the Census undoubtedly leads the way in the application of sample survey technics to status studies in education. Four regularly reported measurements of interest to educational researchers are school enrolment (88, 89, 90, 91, 92), employment of students (83, 84, 85), summary of government finances (93, 94, 95), and school districts in the United States (86, 87). As one can notice and expect, these status studies represent the collection of vital statistics rather than single studies motivated by specific educational problems.

The use of sample surveys to explore specific educational issues is increasing. Holland (31) made a survey of approximately 700 freshmen and sophomores at Michigan State College to assess their perceptions of the instructor. A stratified random sample of approximately 1000 eighth-graders in Kansas schools was collected by Zack (101) to determine the influence of socio-cultural characteristics on educational opportunities in public-school instrumental music. Another stratified random sample of 87 fifth-grade teachers from public elementary schools in Minnesota was used by Johnston (34) to determine the achievement of objectives of elementary-school science. A survey to obtain information for teaching materials for food and nutrition classes was made by Thrift and Ward (80). Interest in the impact of social stratification on occupational expectations of twelfth-grade Michigan boys led Youmans (99) to a sample of 6800 youths from 56 public and private high schools. Hunter (32) studied the attitudes of public-school teachers in a large Southern city toward school and living conditions thru a questionnaire submitted to a population of about 2000. Tumin (82) used a stratified sampling design involving cluster sampling to study the effect of the exposure to mass mediums of communication on readiness for desegregation among white males 18 years old and older in Guilford County, North Carolina.

Two studies of a noneducational nature, which are of interest from the standpoint of sampling procedures, were concerned with transportation flow data (74) and the estimation of the Brazilian coffee crop (75).

Theoretical Design and Assessment of Sampling Errors

There is obviously a close relation between the development and assessment of sampling designs and the properties of various estimates calculated from the resulting sample data. Indeed, the efficiency of any sampling plan is usually assessed in terms of the variances of the resulting estimates. For purposes of discussion, however, an attempt has been made to divide the references in the broad area of theoretical design and assessment into two groups depending upon whether the primary emphasis of the paper is on the sampling design or on the proposed method of estimation. It is believed that such a division, altho slightly arbitrary in some instances, will be useful in highlighting recent developments in this area.

Sampling Design

Two expository papers presented the basic notions of population sampling in nonmathematical terms. Slonim (73) covered briefly but clearly the concepts of simple random sampling; he also discussed estimation procedures and sampling and nonsampling errors. Jones (35) discussed the meaning and purpose of sampling, the relative merits of different sampling procedures, and methods of minimizing the costs of random sampling. Both authors drew illustrations from their respective fields, namely, the Air Force and the telephone industry, and the papers should prove generally useful in providing insight into sampling theory and procedure.

Expository discussions of some specific sampling problems were given by Deming (20) and Dalenius (18). Deming presented a simplified procedure for the selection of a sample and for the numerical computation of the standard errors from the returns. Dalenius discussed the various methods proposed for determining sample sizes in stratified random sampling when the survey is designed to provide information on more than one variable.

A general discussion of stratified random sampling was given by Aoyama (1). The author considered, among other things, the selection of controls for stratification, the influence of stratification on the estimate, and a method of analysis of data based on a modification of Tchebycheff's inequality.

In a paper on two-stage sampling, Sen, Anderson, and Finkner (71) reported on an empirical investigation of various stratified two-stage sampling systems for estimating totals of certain agricultural items in North Carolina. The investigation represented the application of theory developed by Sen to the selection of two primary sampling units without replacement from a stratum where one of the units is selected with probability proportional to size and the other with equal probability.

The problem of planning a two-stage sample involving multiple correlated characters was considered by Chakravarti (11). A model was formulated for the problem, and three procedures for determining optimal sample sizes were given, depending upon particular conditions to be optimized. A numerical illustration was also given.

In other papers on two-stage sampling, Brooks (6) considered the estimation of an optimum subsampling number when the ratio of the variances within primary units is not known but must be estimated. Rangagajan (61) compared two methods of selecting second-stage units from primary units, one in which the number of second-stage units is fixed in advance and a second in which the expected number of such units is fixed in advance.

Multistage sampling plans were discussed by Banerjee (2), Basu (3), Cansado (10), Raj (57), and Roy (65).

An extension of present sampling theory to the problem of sampling over time was considered by Eckler (22). The problem of interest is that of estimating the time-dependent mean of a population. In such a case information contained in earlier samples may be used to improve the current estimates, provided the various samples have some elements in common. A plan for sampling over time such that some old elements are eliminated and new elements are added each time a sample is drawn is called rotation sampling. Three methods of rotation sampling were described in the paper and compared on a cost basis.

Among papers on special sampling designs was one by Patterson (54) which compared four methods of selecting a lattice sample. Krishna Iyer and Singh (41) considered distance travelled as one factor in a lattice design. Sen (70) investigated a multivariate sampling design in which successive observations were not independent. Raj (58) studied the selection of two overlapping samples for multipurpose surveys.

Papers by a number of authors dealt with the choice of sample sizes. Yanedo (98) gave a rule for choosing in stratified sampling between sample sizes proportional to stratum sizes and sample sizes proportional to stratum sizes weighted by estimates of the stratum standard deviations. Optimum allocation, that is, the allocation minimizing the variance of the required estimate, for a successive sampling plan involving correlated variables was considered by Tikkiwal (81). Putter (55) considered an optimal linear decision rule for allocating the sample sizes in the second stage of sampling from a stratified normal population. Grundy (29) discussed a method of stratified sampling with probability exactly proportional to stratum size.

In a comparison of sampling with and without replacement, Kozniewska (40) concluded that sampling without replacement was more efficient for unstratified random sampling. Rios (62) demonstrated that the expected number of distinct elements in sampling with replacement is greater than or equal to the number in sampling without replacement when the variances of the corresponding averages are equated. Singh (72) stated that in a stratified design, the selection of primary units without replacement is usually more efficient when the number of primary units is two, but is not necessarily so in other situations.

In investigating area sampling in agricultural problems, Mokashi (47) compared four types of sampling designs for estimation of timber volume per acre. A cluster sampling plan for estimating crop acreage was also considered by this author (49).

Moser (50) described the principal developments in the sampling of human populations in Great Britain during the past five years, discussing changes in methodology together with new applications. Zarkovic (103) discussed sampling methods in the Yugoslav 1953 population census.

Among the other papers listed, Chapman (12, 13) and Chapman and Junge (14) considered probability models and sampling methods for biological populations which are often mobile in space and difficult of access. Sundrum (79) discussed a method of systematic sampling based on ordered properties. Matthai (46) considered the selection of random numbers for large-scale sampling. Jones (36) discussed the use of random subsample means to evaluate variability and possible bias in samples. Rios (63) considered several problems of maximums and minimums in sampling from a finite population. Kitagawa (39) discussed some problems in survey design.

Methods of Estimation

The problem of estimating the total value of a character in a finite population on the basis of a sample was considered by several writers. Raj (60) proposed unbiased estimates when sampling units are selected with varying probabilities without replacements, and gave exact expressions and unbiased estimates for the corresponding variances. The same author (59) also studied the properties of ratio estimates in sampling with equal and unequal probabilities. Ronge (64) compared ratio and linear estimates of a population total when data on the value of the variable are known for an earlier time.

Das (19) considered the estimation of a population total and its variance in a finite population when the estimate was based either on a specified type of two-stage sampling or on sampling with varying probabilities. Sen (68) also discussed the estimation of the variance in a finite population.

More general types of linear estimates were studied by Godambe (27) and Raj (56). Three papers of Masuyama (42, 44, 45) concerned estimating a total area on the basis of areal samples.

A general procedure for constructing unbiased estimates of the mean value of a variate in a finite population for a specified two-stage sampling design was given by Sandelius (67). A procedure was also given for providing unbiased estimates of the variances of the estimates. A minimum variance unbiased estimate of the mean of a given group when samples are also available from correlated variables in other groups, was constructed by Narain (52). Properties of a sample mean were studied by Bennett (5).

Studies of the variance of estimates were made for ratio estimates in stratified sampling by Mokashi (48), for unbiased estimates in cluster sampling by Yamamoto (97), and for Gini's mean difference in samples from a finite population by Salvemini (66). An outline of a general theory for estimating variability among strata for a specified sampling scheme was given by Sen (69).

Technics for estimating the intercensal population of counties were given by Brown (7) and Crosetti and Schmitt (17). A method of adjusting census estimates to agree with other available census data was discussed by El-Badry and Stephan (24).

Nonsampling Errors

Initial emphasis in sample survey technics was on sampling designs which would yield unbiased estimates of the desired population values. These designs, over the years, have been refined and elaborated to take advantage of possible patterns of variability in the population. Most of these designs, however, began with the assumption that once an individual was selected for the sample, the desired information was obtainable in an accurate and reliable form.

It was early recognized, however, that problems of nonresponse and accuracy of reported data existed. In fact, in discussions of the usefulness of sample surveys as opposed to complete enumeration, an argument frequently advanced was that estimates based on sample data collected by a small number of trained workers were preferable to counts based on complete enumeration carried out by a large number of untrained people.

Discussions of nonsampling errors are now appearing more frequently in the literature. Sukhatme (77), for example, discussed the measurement of observational errors in surveys. A sampling procedure to deal with the problem of nonresponse in mailed questionnaires was developed by El-Badry (23). The effects of nonresponse were also considered by Brownlee (8) and Cohen and Lipstein (15).

In some instances, the accuracy of reported information is checked by taking a second sample from the original data and collecting more detailed information for the individuals in the second sample. Thus, Kish and Lansing (38) reported on discrepancies in the estimates of market values of homes made by the home owners and by professional appraisers. Zarkovic (102) discussed the use of sampling methods to evaluate the accuracy of literacy data. The validation of morbidity survey data by comparison with hospital records was studied by Belloc (4).

The effect of memory on reported responses was investigated by Gray (28) using data from the British Survey of Sickness. An attempt to measure errors due to editing of questionnaires in a census was made by Nordbotten (53). The effect of ignorance on opinions of economic and social issues was considered by Ferber (25). Ferber (26) also investigated the consistency of replies of various family members. The error in crop-cutting experiments due to the bias on the border of the grid was discussed by Masuyama (43).

Hansen and others (30) reported on a redesign of the Current Population Survey to provide for a more efficient system of field organization and supervision as well as on some advances in methods.

A study by Myers (51) of the accuracy of age reporting in the United States concluded that accuracy has improved over the past 70 years particularly for native-born white males. He stated, however, that there is need for improvement in the nonwhite population, and that in general, reporting of ages by women is significantly less accurate than such reporting by men.

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CHAPTER V

Research Tools: Library Resources

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This description of library resources and bibliographical technics brings up to date the similar chapter by Good (14) in the December 1951 issue of the REVIEW, covering the materials published since June 1951. The topics treated include (a) library services, manuals, and general aids; (b) guides to books and periodical literature; (c) guides to theses and selected research projects; (d) serial and occasional bibliographies and summaries; and (e) institutional directories or handbooks.*

Library Services, Manuals, and General Aids

Brickman (5) again reviewed the chief reference works in education. Barton (3) prepared another revision of her brief guide to reference books. Shores (33) gave a detailed discussion of basic reference sources with sections on references by type and subjectmatter area. Two supplements to Winchell and Johnson's bibliographic guide to general reference books (44) were completed.

A research methods bibliography has been a part of *Research Studies in Education* (7) since the 1953 issue. Seeger (32) gave very practical suggestions on the use of library resources in educational research.

Kinney (20) produced a guide to bibliographical style manuals and their use in documentation and research. Campbell (9), Dugdale (12), and Turabian (38) revised their manuals for writers; these publications deal chiefly with style. McCrum and Jones (24) wrote a manual devoted to bibliographical procedures and style used in the Library of Congress.

Guides to Books and Periodical Literature

The guides to books included the annual selection of outstanding educational books (10, 29) and books in education considered significant for an eight-year period (45).

Educational Measurement

The *Fourth Mental Measurements Yearbook* (8) remained the most nearly complete listing of tests and their evaluations; it also listed and reviewed books in this field. It covered the period 1948 thru 1951.

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* A mimeographed bibliography of references additional to those given in this chapter is available from the author while the supply lasts.

Psychology

Six more volumes of the *Annual Review of Psychology* (1) were issued. While the contents varied slightly from volume to volume, there regularly were reviews of areas interesting to educational workers, for example, learning, counseling, statistical research and design, educational psychology, and child psychology. A new book-review journal (11) with author, reviewer, title, and subject index of selected books was started. Latham (22) reviewed guides to literature in psychology.

Textbooks

Textbooks in Print (35), formerly *American Educational Catalog*, is a compilation of all textbooks, with excellent indexes by author, title, and subject.

Periodicals

Tangible evidence of the importance of periodical literature was provided in a study by Saunders (31) for UNESCO. For example, he found that the total number of journals referred to in the *Encyclopedia of Educational Research* approached 400. He concluded that the indexing of periodical literature in the social sciences and humanities was not as satisfactory as that in the natural sciences and that altho education was one of the best served social sciences, there was considerable room for improvement. Another UNESCO publication (39) listed educational research journals in 44 countries.

Guides to Theses and Selected Research Projects

Beginning in 1956, the Trotier-Harman yearly index of doctoral dissertations (37) was consolidated with *Dissertation Abstracts* (26). The latter then became the standard annual comprehensive list of doctor's dissertations.

Periodic compilations of titles of dissertations, theses, reports, and field studies in education were begun. Blackwell (4) listed research in education and educational psychology presented for higher degrees in the United Kingdom and Ireland beginning in 1918. Brown, Lyda, and Good (7) began an annual listing of doctoral dissertations completed and under way in education together with a research methods bibliography for the year. The first section, altho possibly more helpfully arranged, substantially duplicated Trotier and Harman (37) and later, the corresponding section of *Dissertation Abstracts*. The second section continued the reports originated in the *Phi Delta Kappan* (17); Good's bibliographies are helpful. Lamke and Silvey (21) began an annual classified listing of titles of master's theses in education presented for degrees in the United States and Canada beginning in 1951-52. The compilers expressed the hope that making such research generally known might help give it stature.

Indexes and abstracts of foreign physical education literature were made available beginning in 1955 (18). The Clearing House for Research in Child Life changed to semiannual publication (42) and no longer lists certain kinds of medical studies. UNESCO (39) listed educational research bibliographies and directories in 44 countries. Bibliographies of dissertations in fields related to education are easily located in the well-known *Education Index;* therefore they will not be listed here.

Serial and Occasional Bibliographies and Summaries

Other continuing bibliographies or summaries included guidance (16), occupational literature (13), audio-visual education (23), history of education (6, 19, 43), psychiatric books (25), reading (15, 36), teacher education (2), articles on education in lay magazines (27), criticisms of education (34), and questionnaire studies in education (28).

Institutional Directories

New education directories or handbooks were started on the international (30, 40, 41) and the national (46) levels.

Summary

This chapter has been devoted to technics and procedures for work with reference tools in the library. Research theory has always been 10 to 20 years ahead of practice for many reasons. The development of action research, study councils, a variety of new reference tools, and summaries of research have been particularly valuable in stimulating application.

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CHAPTER VI

Research Tools: Observing and Recording Group Behavior

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DURING the period covered by this REVIEW, discussion and experimental activity concerned with group behavior continued at a vigorous rate. Altho the years cannot be characterized as encompassing great originality in methodological construction, it seems safe to argue that they have been dominated by continuous refinements of useful observational methods and by increased knowledge of variables which act to bias and distort the observations themselves. A noticeable characteristic has been the continued use of observational and recording technics for such practical purposes as assessment and selection programs.

This review of the literature represents only a sample of the numerous research studies in the area. The authors have tried to limit their study to experimentation which more or less directly involves in its design the exploration and/or refinement of technics of observing and recording group behavior. It should also be noted that the total literature on this topic is not represented because of the exclusion of studies reported in languages other than English. The authors regret their lack of access to material from this expanding source.

Measurement of Group-Membership Interaction

During the period under examination, energy was invested in locating and studying variables which affect group-member interaction. Jensen (30) suggested a seven-faceted conceptual framework for observing both the social structure and the interaction within classroom groups. The dimensions for study were (a) problem solving, (b) authority-leadership, (c) power, (d) friendship, (e) personal prestige, (f) sex, and (g) privileges. The remainder of this review will deal with the various approaches to these areas.

At Ohio State University a 10-year period of interdisciplinary research was described in a series of monographs. One report in this series was by Stodgill and Shartle (51) who studied administrative and leadership relationships within an established, hierarchal organization. They described the development of an interview technic which yields sociometric-type data, and a set of scales to measure the leader's perception of his responsibilities, authority, and delegations (*RAD* scales). Several other technics which were developed will be discussed in a later section. In a second monograph, Fleishman and others (17) produced statistics relevant to a scale called the *Leadership Behavior Description Questionnaire (LBDQ)*. This scale was used in an industrial setting by foremen and their subordinates and was useful in predicting and describing the relationship between these individuals. Halpin (22) described the *LBDQ* as a two-dimensional scale, containing 40 items selected from a factor-analysis matrix. It was designed to measure the behavior of a leader in terms of how he "initiates structure in interaction" and how much "consideration" he exhibits. Halpin further pointed out that the scale had been used fruitfully in measuring the effectiveness of leaders in military, industrial, and educational settings. Hemphill (27), at one time associated with this project, utilized five or six scales in a study of the relationship between behavior of college department heads and the reputation of the departments for being well administered. In addition to the *RAD* and *LBDQ* scales already described, of particular interest is the *Group Dimensions Description Questionnaire*. In his manual Hemphill (26) stated that this instrument was designed to elicit a respondent's perceptions, attitudes, and feelings about his group. By combining every group member's scores it was also possible to obtain a profile of the major dimensions which characterized the group as seen by its members. Hemphill stated that the scale samples 13 dimensions of group structure and reported data to support claims for reliability and validity.

Shevitz (48) investigated Hemphill's hypotheses regarding leadership origins in three-man groups by obtaining data from two trained observers. The observers utilized behavior categorized according to a scheme worked out by Hemphill and the Ohio State group. Olmsted (44) developed a 22-item fixed-response questionnaire to evaluate the adequacy of leadership of the formal group leader. Of particular interest may be the measure of "leader favorableness" which was claimed to be independent of the usual halo effect found in such measures.

A more recent development was the emphasis on peer- and self-ratings. Webb (59) studied the relationship between self-ratings and objective measures of intelligence. The rating device used was very simple, requiring subjects to rank their peers and themselves into a normalized scale from most to least intelligent. The results prompted Webb (58) to develop a novel form of self-group ratings which would yield high reliabilities for self-measures. In this technic, "Self-plus-minus," the individual compares himself with every other member of his group on a particular trait. The result is a greater number of self-ratings and higher reliabilities. Mayo (38) studied the relationship between peer-ratings and halo effect and reported that not all of the variance found was attributable to halo effect. Suci, Vallance, and Glickman (52) found that peer-rating reliabilities were not markedly affected by variation in the objective basis of the choice, or by the rater's liking certain members of his group. Hoffman and Rohrer (28) developed a peer-evaluation scale. The score on this scale may be generalized to groups outside the reference group from which the score was obtained. Buchheimer and Pendleton (7) studied the *Group Participation Scale* originally devised by Pepinsky, Siegel, and Van Atta and tentatively concluded that it is reliable and valid. On this instrument, group participants rate each other on such behaviors as "*initiate, sustain, define*, and *direct* activity toward goals which were held by the group." In summary, the work in this area is promising and encouraging. The technic appears to be quite useful for obtaining intimate data about intragroup relations which are not easily accessible to the observer's eye or to other forms of paper-and-pencil tests.

Sociometric Instruments

An area of considerable activity lies in the development and refinement of sociometric-type instruments. Marshall (35) reviewed previous attempts to study the relationship between sociometric choices of preschool-age children and several criteria of social behavior. She concluded that the use of antiquated statistical procedures and methods of investigation had not yielded fruitful results. Acting on this conviction, McCandless and Marshall (33) constructed a picture sociometric test for use with preschool-age children, utilizing large photographs of children in the same group and several oral sociometric-type questions. In a later study (36) they investigated the relationship between choices of friends and such variables (observed by a group of sophisticated judges in two-minute segments) as associative play, friendly approach, conversation, hostile interaction, attention, and no response. The outcomes suggest that this may be a valuable technic.

In an approach distinguished by its originality, Gardner and Thompson (19) described the development of five social relations instruments. In constructing their scales, which yield near normal distributions, the authors tried to take into account such factors as (a) the ambiguity of needs underlying the choice, (b) the inequality of rankings by means of a nominations approach, and (c) the lack of generalizability of data from one group to another. By manipulating the obtained data, eight indexes of an individual's social relations status in a group and nine indexes of social group structure are calculable.

Not all the activity in this field was in the development of new instruments. Mouton, Blake, and Fruchter (42, 43) analyzed 53 studies conducted in military, industrial, and educational settings and concluded that the sociometric-type test has considerable reliability and validity. They also suggested some of the variables which affect data and commented on additional uses for the obtained information. Davitz (14) studied the relations between sociometric choice and perceived similarity and dissimilarity. Of particular interest to other investigators should be the manipulation of sociometric instruments so as to measure perceptions of similarity and dissimilarity. Vidich and Shapiro (56) in a study using a large sample found that measures of prestige as revealed by a sociometric-type questionnaire and an anthropological field-worker's ratings were complementary but not overlapping.

The number of choices to be allotted a subject, another area of concern in the construction of sociometric tests, was investigated by Gronlund (20). He was interested in the stability of weighted and unweighted scores based on three, four, or five choices. Tagiuri, Bruner, and Kogan (53) developed a mathematical model for computing the chance frequency and variance of the dyadic relationship obtained within relational analysis. Keislar (31) constructed a special scoring formula for the "Guess-Who" type questionnaire which is claimed to be more valid than and just as reliable as "older" technics. The special advantages of the "new" formula lie in the acquisition of a normal distribution and the minimizing of the effect of unequal familiarity of all members in a large group.

Barr (4), Luebke (32), and Hale (21) discussed ways of analyzing and charting or mapping the results of sociometric tests. Hale's particular contribution was the development of five criteria, derived from current group dynamics literature, which might be used to measure the social growth of a group over a period of time as revealed by test-retest sociometric data.

Direct Observational Technics

A more time-consuming technic for studying group-member interaction is the direct observation of a group in some artificial or natural setting. This form of obtaining information requires large amounts of time because of the training of judges or raters and because of the number of raters used being usually larger than is the case with sociometric or peer-group ratings. As one might expect, however, direct observation is particularly effective in investigations of certain kinds, for example, communications, problem solving, and the like. Bales (2) designed a 12-category interaction scale which allowed the trained observer to capture the flow of interactions within a group. Altho the original scale was completed prior to 1954, the article reviewed is particularly useful for the novice or the lay individual interested in dynamics of small-group interaction. Withall (62) described a technic for obtaining a measure of the teacher's classroom interactions which eliminated the use of many judges, but on the other hand, probably entailed a large expenditure of money for equipment. Altho no evidence was presented to show that the technic used was reliable or valid, the use of a time-lapse camera clicking pictures every 15 seconds and a sound tape recording must be considered an ingenious way to obtain information about teacher-pupil interactions. Moustakas, Sigel, and Schalock (41) developed an observation schedule which has 82 units for describing child behavior and 89 units for describing adult behavior. The categories were designed to measure overt behavior and none was constructed to be interpretive or evaluative. The authors claimed that observer and category reliability were high.

Most of the experimentation in group dynamics is usually designed to include some combination of observational and paper-and-pencil technics. The concluding pieces of research to be reviewed will be considered according to the problem area they represent.

Communications

The most frequently utilized technic in the study of communications is direct observation. Hearn (24) used the Bales categories to determine the direction of remarks between members of the group in leaderless and in trainer-dominated sessions. Porter (47) studied the relationship between the type of participation in a small-group discussion, as measured by the Bales categories, and feelings of satisfaction. Cervin (10) predicted from a stimulus-response-type model that a person of high emotional responsiveness would speak first, participate more, and change his opinions less than a person of low emotional responsiveness. Emotional responsiveness, as measured on a Guttman type paper-and-pencil technic, and observation of the group supported the original predictions.

Group Problem Solving

The comparison of the effectiveness of group versus individual problem solving, the development of criteria for measuring effectiveness, and the process of group problem solving were of considerable interest to investigators. Dickens (15) devised a formula based on the hypothesis that one aspect of effectiveness is the spread of participation among group members. McCurdy and Eber (34) defined effectiveness on a three-man light-switch series task in such behavioral terms as (a) time per unit of work, (b) correct switch turnings per unit of work, (c) errors per unit of work, and (d) errors per unit of time. These criteria seem to be a successful attempt to locate facets of a situation which may be objectively observed and recorded. Torrance (55) had members of bomber crews respond to projective-type pictures construed to be "psyche-group" and "socio-group" oriented. He studied the relationship between a group's perceptions of its functioning and its actual performance according to military criteria. Fiedler (16) studied the relationship between a basketball team's effectiveness and the assumption of similarity among its members. The measure of assumed similarity was derived by analyzing the responses that the team members made for each other on a questionnaire. The merit of these methods apparently lies in the depth of analysis they permit the investigator.

Hays and Bush (23) employed a mathematical model to predict group decision making. Their models took into account two types of group action: the group-actor model where individuals decide together, and the voter model where the individuals' choices are independent and the decision is by majority vote. Damrin (13) developed a unique problem-solving test under the sponsorship of the Russell Sage Foundation. This test involved the use of a set of 36 interlocking blocks in different colors. Each member of the group was given one or two blocks and the group was then instructed to make a plan for reproducing a model figure constructed from another set of blocks shown them by the test administrator. The test was successfully used from the third-grade level to adult groups, and wide variations in the quality of group performances were noted at every level. Methodological problems connected with the technic include (a) quantification of group performance from observers' protocols, (b) reduction of bias introduced by personality of test administrator, and (c) the effects of group size on performance. The *Russell Sage Social Relations Test* will undoubtedly be refined and modified to become an important measure of group performance. Even without these refinements in its present stage of development the *RSSR Test* provides valuable demonstration material for workshops interested in cooperative educational goals.

Conformity

An area of increasing concern to social psychologists is conformity behavior. Matthews and Bendig (37) formulated a statistic, the "Index of Agreement," which quantifies the amount of agreement between group discussants. Simon and Guetzkow (49) devised a mathematical model to examine Festinger's five hypotheses relevant to group pressure, communications, and movement toward uniformity of opinion. Five equations were developed which take into account a correction for time and a variable designated as feedback. This particular construct is very useful in explaining much of the variance in Festinger's and in his colleagues' experiments. Blake and Brehm (6) in a novel project demonstrated how a tape recording of a simulated group could produce conformity on the autokinetic perceptions of an uninitiated group member. Burdick (8) also produced conformance of opinion about juvenile delinquency by using a simulated group discussion. The methodology of these two studies and their results seem to suggest a very economical way to study group pressure effects and perhaps other group effects upon individual behavior. Crutchfield (12) described a laboratory-type arrangement for studying conformity behavior. His "quasi group-interaction method" serves to standardize the situation; hence the stimuli for each subject are identical.

Social-Emotional Climate

Forlano and Wrightstone (18) revised the *Ohio Social Acceptance Scale,* a peer-rating instrument, to assess the quality of social acceptance in a classroom. Social acceptance was operationally defined as the percentage difference between the median acceptance ratings and rejection ratings within a class. The results of their study suggest a marked use for this measure. Wandt and Ostreicher (57) devised 14 scales, each containing a nine-step interval to measure the consistency of teacher behavior in the area of social-emotional climate. Gardner and Thompson (19) developed several technics for measuring "esprit de corps" and "group effectiveness" components of morale.

Phillips and D'Amico (46) purported to measure group cohesiveness by observing changes in response on a pre-post sociometric-type test. The resulting changes were analyzed to study the relationship between cohesiveness and the social-emotional climate the group was required to work within while solving a problem. Pepitone and Kleiner (44) formed groups of male campers into teams on the basis of sociometric choices and observed the changes in cohesiveness as the result of varying the probability of status gain or loss.

Role Behavior

Many of the studies of role behavior utilized a combination of direct observational technics and subject self-ratings or group-ranking procedures. Talland (54) used the Bales Interaction categories and a therapeutic interaction analysis scale to study the structuring over a period of time of 15 initially informal psychotherapy groups. The subjects also ranked their fellow group members on a scale designed to measure status perception. Slater (50) likewise used the Bales categories to study role differentiation as affected by the manipulation into high-status groups (members perceive themselves as similar in problem-solving effectiveness) and low-status groups (members perceive themselves as dissimilar). Mitchell (39) observed six sessions of a citizens committee seeking to evaluate itself. The roles played by the various members were categorized as problem-solving behavior, maintenance of group atmosphere, and "group blocker" behavior.

Another method for obtaining information relevant to the role an individual and/or his group perceive him playing is to request responses from the group and the individual on such devices as sociometric tests and peer-self ratings. Crowell, Katcher, and Miyamoto (11) designed two questionnaires dealing with a person's feelings about his skills as a communicator and a communicant. Subsequently, self- and group-member-ratings of performance in three discussion groups were related to the self-perceptions of the individuals. By manipulating the instructions on the same sociometric-type instrument, Hollander and Webb (29) were able to study the relationship between leadership, followership, and friendship among a group of naval air cadets. Carter (9), as the result of a careful factor analysis of a great many previous studies, found three factors which might be useful in the study of leadership behavior. The three which emerged from the study were (a) achieving various personal goals, (b) aiding attainments by the group, and (c) sociability.

Assessment and Selection

Ever since the OSS assessment program demonstrated the feasibility of using group technics in selecting men for critical jobs, other organizations have attempted to use these technics in the selecting and training of candidates for vital positions. Perhaps the major methodological problem for the assessment team is the development of situational tests which yield data relevant to prediction of individual performance on a job. Weislogel and Schwarz (60) suggested three criteria for designing an effective problem. Crutchfield (12), in dealing with the problem of measuring conformity to group judgment, suggested criteria which should be accounted for in the construction of any type of situational test. Bringing their experience to bear, Bales and Flanders (3) discussed the planning necessary for setting up a functional observation room for studying small groups. They treated such topics as comfort and space requirements, needs of research staff, visiting spectators, and the design of the experimental room.

Bass (5) studied the utility of leaderless-group discussions for evaluating leadership behavior and concluded that the technic had high validity as well as predictive value. Wilson and Robbins (61) reported the use of leaderless-group discussions as one aspect of a selection program for potential guidance workers. This article dealt particularly with such problems as the size of the group being observed, the number of judges, the effect of judges' presence, and the length of the discussion period. In considering the usefulness of these technics, one must also be concerned with the handling of the accumulated information. Morris (40) studied some of the factors which affect the validity of the judgment of assessors and concluded that a consensus of judges' ratings may result in more valid judgments. He further asserted that one must analyze the grouping factors which may influence the judges' consensus. Altho this technic takes more time, both in terms of testing hours and rater time, one can only hope that other organizations will begin to find this technic promising enough to experiment with it in the selection and assessment of candidates for various positions.

Conclusion

The prognosis for future improvements and refinements in the methodology of observing and recording behavior in groups seems good. The period of this review is highlighted by the replications of previous studies, the development of mathematical models, an increase in interdisciplinary research as exemplified by the Ohio State studies and the December 1954 issue of the *American Sociological Review* (1), and the expenditure of large amounts of money for long-range studies in natural settings, for example, military and industry.

What must follow in the coming years if group theory and methodology are to advance is (a) the continuous development of more rigorous technics of locating and measuring variables connected with group characteristics and group structure, (b) a closer relationship between theory and data gathering (too many studies appear to gather data and fit a theory to them rather than vice versa), and (c) a greater uniformity in semantics. Hemphill (25) called for the development of a taxonomy of group characteristics which would operationally define its terms as well as permit accurate measurement. Altho these objectives may seem idealistic, it is unlikely that advancements in group theory or methodology can continue without some attempt to approach them.

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CHAPTER VII

Research Tools: Scaling and Measurement Theory

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THIS CHAPTER covers scaling theory from June 1954 to June 1957. Limited space precluded several pertinent references, and those included reflect an attempt to give adequate coverage to developments deemed important by the reviewers. Elementary texts on scaling methods by Guilford (35) and Edwards (25) appeared during this period.

Theories of Measurement

Old controversies about fundamental measurement in psychology were recently revived. Siegel (70) believed that arithmetic operations and statistical technics based upon them were limited to scales with interval properties, since "the operations allowable on a given set of scores are dependent on the level of measurement achieved." Stevens (72) concurred, but Savage (66) disagreed. Mount (61) denied the traditional necessity of demonstrating physical manipulations paralleling various scale operations and believed numerical measurement to be justified merely by the specification of instructions for assigning objects or attributes to a numerical reference system.

The recent appearance of a strong trend toward axiomatization in scaling theory will undoubtedly contribute to a resolution of such controversies. Suppes (75), starting from a set-theoretical definition of a theory of measurement, formalized the logical foundations of scaling and provided an axiomatic treatment of models underlying ordinal, interval, and ratio scales. Scott and Suppes (67) also discussed logical aspects of measurement, particularly the conservation of axioms. Coombs (17) meanwhile clarified some properties of underlying models by classifying interrelationships between the scaling of individuals and the scaling of stimuli. In another classificatory scheme, Coombs (16) located known scaling methods in a 2 x 2 x 2 table.

Axiomatic Models

Several axiomatic models for different types of measurement are considered together in this section solely for convenience in referring to a unified approach to model construction. Davidson and Suppes (20) axiomatized utility and subjective probability in terms of an indifference relation for alternatives equally spaced in utility. Adams and Fagot (3) intensively analyzed a two-dimensional measurement model assuming additive utilities. Luce (49) formulated a probabilistic theory of utility, and a theory of utility discrimination in terms of "semi-orders" (50). Semi-orders do not imply that the relation of transitivity holds: that is, $a = b$ and $b = c$ do not necessarily imply $a = c$. A simplified axiomatization of semi-orders was given by Scott and Suppes (67). Galanter's attempt (29) to apply experimentally an intransitive matching relation serves to illustrate the difficulties currently encountered by many axiomatic models in handling the concept of error.

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* The reviewers are indebted to Frederic M. Lord for his helpful comments on the manuscript. A slightly expanded version of this chapter with a 205-item bibliography will be distributed as an Educational Testing Service Research Bulletin available from the authors.

Luce (51), in perhaps the most important paper reviewed in this chapter, formulated a probabilistic theory of individual choice behavior based upon an intuitively reasonable axiom with extremely general and powerful consequences. The basic axiom may be stated as follows: If T is a finite set of elements and R is a subset of S, which is a subset of T, the probability $P(R;T)$ that an individual will select an element contained in the subset R when the choice is restricted to T is equal to the probability that the chosen element is in R when selected from S times the probability that it is in S when chosen from T; that is, if T is finite and $R \subset S \subset T$, then $P(R;T) = P(R;S)P(S;T)$. One important consequence of this axiom is the existence of a ratio scale v, which may be determined in several ways from different probability combinations. The relation between paired-comparison probabilities, $P(x,y)$, and the underlying scale values $v(x)$ is as follows: $P(x,y) = \dfrac{v(x)}{v(x)+v(y)}$.

Decision Process and Utility Measurement

Davidson, Suppes, and Siegel (21) tested their axiomatic model of utility (20) in a betting situation. Subjects were confronted with choices between two options: one offering a 50-50 chance of winning a or losing b and another offering a 50-50 chance of winning c or losing d. Preferences between options were used to order utility differences among elements. Considering the fact that these models make little provision for handling error, the goodness of fit obtained is very encouraging. Siegel (69) also used preference between probability combinations of stimuli to order scale intervals. Such options as a 50-50 chance of winning a or c versus certainly receiving b were used to generate a "higher-ordered metric scale." Hurst and Siegel (42) applied this scaling technic by betting with prison inmates for cigarettes. They reported that utility was not linear with number of cigarettes. Their treatment of scaling errors was vague. Davidson and Marschak (19) presented experimental evidence that choice behavior may be considered "stochastically transitive." Edwards (26) employed experimentally an additive hypothesis (3) that the utility of n identical bets is n times the utility of one such bet.

The use of bets in decision studies represents an interesting gimmick for obtaining metric information about utility intervals while avoiding the interaction effects that may plague methods using composite stimuli. At first glance, these betting procedures seem of dubious value in psychological contexts. On the other hand, traditional scaling methods may have overlooked the role of subjective probability in individual choice behavior. Responses to questionnaire items may perhaps be fruitfully regarded as decisions under uncertainty—uncertainty about circumstances in which an item is meant to apply, about the use to which the responses will be put, and the like.

Coombs's Models and Methods

Coombs's scaling models have been criticized for their inability to handle error. Tho Coombs did not come forth with a full-dress theory of error, a tendency to meet this problem can be observed. Coombs (15) presented an assortment of judgmental methods for scaling stimulus similarity, and incidentally recommended replication of judgments as a means of catching occasional errors. Dember (22) applied one of these technics to the scaling of gray patches differing in brightness. He suggested the use of differential reaction times to resolve inconsistent judgments.

Runkel (65) applied unfolding technic as an indicator of interpersonal "cognitive similarity." Coombs (18), in discussing the construction of a "social utility scale," was able to apply the unidimensional unfolding technic. In this treatment he often wrote as tho an interval scale allowing continuous distributions was uppermost in his mind. Thus it would appear that Coombs has budged slightly from the extreme position sometimes imputed to him.

Paired Comparison Models

Morrissey (60) and Gulliksen (37) independently presented equivalent least squares solutions for incomplete paired comparisons. The latter suggested an iterative procedure which markedly reduces computation time. Gulliksen and Tukey (39) proposed a variance-components analysis for the reliability of paired comparisons. Gulliksen (36) utilized a quantity called the "comparatal dispersion" ($\sqrt{\sigma_i^2+\sigma_j^2-2r_{ij}\sigma_i\sigma_j}$) to measure accuracy of paired comparison judgments. Harris (40) revised Thurstone's Law of Comparative Judgment to include asymmetries between a comparison pair AB and its experimentally independent complement BA. The revision permits the extraction of time error and order effects. Gulliksen (38) tested four laws for predicting the scale value of a composite stimulus from the scale values of its components. Linear and negative exponential curves both gave a good fit for food preferences. Rimoldi (62) also obtained a linear relationship for predicting scale values of combined stimuli from components in a study of "famous men you'd like to know." In this way the Thurstone methods, thru the scaling of composite as well as single stimuli, offer an alternative to bets in the measurement of utility (21).

Kendall (45) derived scale scores by finding the principal characteristic vector of a paired-comparisons matrix. The technic is applicable to incomplete data and may be used on a single set of judgments from one individual. Suppes (75) gave an axiomatic formulation of a stochastic model for paired comparisons which assumes that $P(a,b)$, the proportion of times a is preferred to b, is a monotone increasing function of the difference in scale values; that is, $P(a,b) \geq P(c,d)$ implies $v(a) - v(b) \geq v(c) - v(d)$. Suppes described a linear programing solution to these inequalities.

In the Bradley-Terry model (11, 34) for paired comparisons, $P(a,b)$ is related to scale parameters π by $P(a,b) = \frac{\pi a}{\pi a + \pi b}$. This relationship also appeared in the Luce model (51) discussed above. Thus the "seemingly arbitrary" (47) Bradley-Terry formulation is by hindsight justified thru Luce's axiom. Furthermore, a powerful means for applying the Luce model experimentally is thru the extensive Bradley-Terry machinery (12). Abelson and Bradley (2) applied the method to stimuli with combined attributes in a 2 x 2 factorial. Such an application suggests a multidimensional extension of the model for known stimulus dimensions. It is of interest that if the logistic curve is substituted for the normal ogive in the Thurstone model, log πa corresponds to Thurstone's scale value (cf. 34). Adams and Messick (4) proved that the *only* distribution function allowing the Luce model (51) and Suppes's monotone model (75), of which Thurstone's Case V is a special form, to fit the data simultaneously is the logistic. In view of the coordinating power of Luce's axiom and the negligible difference in practice between the logistic curve and the normal ogive, the use of the logistic for scaling is compellingly suggested. However, empirical comparisons (8, 43) of several different paired comparison models have resulted in remarkably similar scale values.

Categorical Judgment Methods

Scaling solutions for successive intervals have taken several forms under various names, but they reflect essentially the same basic model. Since some of these solutions (cf. 64) assumed equal stimulus dispersions, the flexibility of unequal dispersions (13) in the general model has been largely overlooked (74). The basic Thurstone formulation was axiomatized by Adams and Messick (4) and generalized to nonnormal stimulus distributions. Diederich, Messick, and Tucker (23) derived a weighted least squares solution for successive intervals which is applicable to incomplete data; the corresponding punched-card procedures were also outlined (57). Rozeboom and Jones (64) analyzed the effects of various errors upon successive interval scale values and found the scales to be stable under sampling fluctuations and insensitive to small departures from normality and equality of dispersions. Guilford (35) suggested a chi-square test of goodness of fit for successive intervals which inappropriately assumes independence of proportions across categories. Bock (9) proposed assigning weights to ordered categories such that *n* judges classifying *m* stimuli *r* times each produce a maximum variance ratio for the stimuli. The technic permits the statistical rejection of deviant judges. Rosner (63) assayed a category judgment model in which scale values are directly calculable from the probability densities of stimuli over response categories. The derivation implicitly contains the restrictive assumption that all finite category widths are equal.

Morris and Jones (59) applied to preferences among "ways of life" in five cultures a factor analysis of successive intervals data. Kelley and others (44) noted that extreme discrepancies between equal-appearing interval attitude scales for Negro versus white judges were substantially decreased by successive intervals technics and almost eliminated by paired comparisons. Evidently judgmental distortion effects as a function of attitude do exist but are extremely subtle. Gardner and Thompson (30) carefully constructed interpersonal rating scales by having subjects select anchoring individuals from an outside reference group. Cliff (14), scaling adjectives and adjective-adverb combinations, obtained exceptional support for the hypothesis that the common adverbs of degree serve to multiply the intensity of adjectives.

Psychophysical Scaling

Stevens and Galanter (74) produced a pivotal monograph which differentiated psychophysical methods into two classes: those yielding "category scales" (equal-appearing intervals, successive intervals, paired comparisons, triads, and equisection) and those yielding "magnitude scales" (fractionation, doubling, constant sum, and magnitude estimation). The assembled data depicted category and magnitude scales as nonlinearly related to each other. From this the implication was drawn that category scales are artifactual, while magnitude scales are true scales. To forestall the reader from drawing the opposite conclusion, two factors tending to distort category scales were enumerated: heterogeneity of subjective category widths and of stimulus dispersions. One would look to the method of successive intervals to correct these two sources of distortion in equal-appearing intervals. Extraordinarily, the huge Stevens and Galanter compilation of category scales does not include any successive intervals analyses. It would be of utmost interest to apply directly to the assembled psychophysical data the method of successive intervals allowing unequal stimulus dispersions.

Controversy over the properties arising from magnitude scale methods still rages. Garner (31) pointed out that fractionation technics suffer from the unlikely assumption that the verbalized stimulus ratio corresponds to the *true* stimulus ratio and proposed a method using fractionation and equisection jointly. Apart from the content of the argument, the present reviewers lament the usage: *true* ratio scale. No single criterion for such absolute truth presently exists. Stevens (73) summarized evidence that many psychophysical scales derived by magnitude methods approximate a power function law. Thus the magnitude methods are properly justified by their excellent ability to coordinate empirical data. Simple faith in ratio-scales, however, via the application of magnitude methods to expressive faces (28), neckties (24), and the like is not likely to prove especially rewarding.

Multidimensional Scaling

Many contributions to multidimensional scaling theory and method have followed the impetus given the field by Torgerson. Developments up to 1955 were reviewed by Messick (56). The multidimensional method of successive intervals (MDSI) was empirically evaluated (54) in the area of color perception by comparisons with scale values obtained from the Munsell color system and from the complete method of triads. The correspondence between these sets of scale values was exceptionally good, the proportions of common variance exceeding .95 (68). Mellinger (53) also applied MDSI to a variety of colors and obtained a separate dimension for each hue. However, the colors were extremely disparate, and the result would probably not have occurred with a more circumscribed set of stimuli. Agreement between *scaling in the large* with supraliminal differences and *scaling in the small* with confusions is not necessarily to be expected. Abelson (1) and Messick (55) used MDSI to compare attitude perceptions for two diverse groups. They both found merely minor variations between groups, suggesting that judges' attitudes distort only slightly their perceptions of attitude relationships.

Shepard (68) proposed a model for using confusion errors in paired associate learning as a basis for multidimensional scaling. He applied this important new technic to confusions among color stimuli, and the proportions of variance common with earlier analyses (56) exceeded .97. Ekman (27) scaled pairs of color stimuli with respect to similarity by the method of equal-appearing intervals and factored the obtained matrix of similarity scores directly! Such an analysis probably routinely results in spurious added dimensions. This criticism also applies to Andrews and Ray (6). who interpreted a simple square root function of P*(a,b)* as a correlation coefficient to be factored directly. Wilson (78) defined a simple but somewhat arbitrary distance function relating squared distance to the proportion of times two stimuli are judged similar in the method of triads. Tucker (76) discussed a vector model for paired comparisons which yields a dimensional representation of the stimulus space as well as a group preference scale.

Guttman Scale Analysis

Guttman's coefficient of reproducibility (Rep) typically has a variously high expected value under the null hypothesis of item independence. Obtained Reps are therefore apt to be misleading, and a number of alternative coefficients have been suggested. Green (33) proposed an "Index of Consistency" with the formula, $I = \frac{\text{Obtained Rep—Chance Rep}}{\text{Chance Rep}}$. Borgatta (10) recommended a different index based on much the same grounds. White and Saltz (77) reviewed many but not all the alternative coefficients and favored Green's because of an accompanying approximate significance test. Milholland (58) considered nonstandard assessments of reproducibility. His most intriguing suggestion was a coefficient giving the percentage of individuals whose response patterns fit perfect scale types, with multidimensional Coombsian scale types included. Slater (71) revived a technic, originally suggested by Guttman in 1941, that simultaneously assigns scores to people and to item responses according to a maximum variance-ratio principle. The technic applies to items with any number of alternatives. A significance test for scalability was given. Lord (48) showed that Guttman's principal components are the scoring weights that maximize the generalized Kuder-Richardson reliability coefficient and that the principal component for any dichotomous item is the same as the ordinary factor loading of the item divided by the item standard deviation. Applications of Guttman scaling were legion; space precludes their inclusion here.

Latent Structure Analysis

Anderson (5), Gibson (32), and McHugh (52) offered improved matrix solutions for latent class parameters. McHugh gave a significance test for the number of latent classes. Birnbaum (7) showed, for factorially homogeneous items whose trace lines are logistic curves, that a certain weighted average of a respondent's item scores is a sufficient statistic for estimating his score on the underlying common factor. Lazarsfeld (46) discussed various aspects of latent structure models. Hays and Borgatta (41) found that the general three-parameter solution in the latent distance model is to be preferred in practice to the restricted two-parameter solution.

The present reviewers were disappointed by the absence of substantive applications of the Lazarsfeld models in the available literature.

Criteria for Scale Evaluation

Traditional psychometric theory recognizes multiple criteria for evaluating a measurement procedure. Scaling theory should do likewise to avoid futile bickering as to whose numbers are on the side of the angels. Replicability of scales in repeated experiments is a universally recognized criterion of scale goodness. Beyond this, three other criteria by which to evaluate a psychological scaling technic should be mentioned: (a) Internal consistency. Does part of the scaling data appropriately predict remaining scale relations? Indeed, does the model provide any means for making such predictions? (b) Coordinating power. Does the scaling technic yield a body of empirical scales which can be organized coherently? (c) Appropriateness as a psychological model. Is the subject's behavior treated consistently with what is known about similar human behavior in other psychological contexts?

In the opinion of the reviewers, the most crucial differential criterion of the three is the last, for it is on the basis of their implications for general psychological theory that different scaling models will ultimately prove their relative merits. We propose a tentative classification of existing scaling methods according to their psychological model of what the individual judge or respondent is "really" doing.

1. Deterministic models: Guttman, Coombs, Stevens, Siegel (69), Davidson-Suppes (20). The individual has a fixed "real" scale of judgment or preference, and his verbal reports reflect "real" metric properties.

2. Stochastic models

a. Roulette wheel or urn models: Lazarsfeld, Bradley-Terry (11), and possibly Luce (51). The individual acts as tho he consults a table of random numbers before making certain choices. The scale unit is a probability measure.

b. Confusion models: Thurstone and developments in his tradition. The individual acts as tho his momentary impression of the stimulus is subject to random fluctuations. The scale unit is a discriminal dispersion.

c. Dynamic vacillation models: No existing models altho Coombs (18) implied such a formulation. The individual acts as tho he *himself* shifts his standards of judgment or preference from moment to moment. The scale unit would presumably be a dispersion unit.

d. Noncommittal models: Suppes (75), Davidson-Marschak (19), and possibly Luce (51). The axiomatic systems postulate stochastic behavior without seeking an underlying psychological "explanation."

Deterministic and stochastic models each have their difficulties. The deterministic models are forced to make arbitrary assumptions about error, while the stochastic models often pool data from different individuals even tho for such areas as attitudes, personality, and preferences, the assumption of subject homogeneity is dubious.

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CHAPTER VIII

Research Tools: Statistical Methods

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THAT the rate of growth of statistical methodology has been nothing short of amazing during the past three years is immediately apparent to anyone who examines the amount of research published in the journals. Even within the somewhat restricted area of coverage represented by this chapter more than 750 references were located of which slightly more than 200 were included. In view of space limitations in the REVIEW it appears that chapters on research and statistical methodology must be increasingly selective. Altho rigid criteria were not set in the choice of books and articles to be reviewed, an attempt was made to cite those publications, relative to the scope of this chapter, that represent (a) a significant modification of aspects of statistical theory and/or (b) an important contribution of particular relevance to the analysis of data associated with research problems in education.

The last comprehensive single chapter on developments in statistical theory was the excellent one by Johnson and Moonan (105) in the December 1951 REVIEW. The December 1954 issue covered most of the publications in statistical methodology from 1951 to 1954. The portions of this chapter dealing with nonparametric methods, regression and correlation technics, and factor analysis represent extensions of the corresponding chapters by Blum and Fattu (22), Hoyt and Johnson (102), and Solomon and Rosner (179) in the December 1954 issue, and cover the three-year period following July 1, 1954. In addition, attention is given to a few earlier noteworthy contributions not previously noted in the REVIEW.

It should also be mentioned that a number of contributions to statistical methodology have been omitted in addition to those represented by the content of other chapters in this issue. In particular those statistical methods that seemed to be especially applicable to problems of test construction, analysis, and evaluation were deferred for a chapter in a subsequent issue on educational and psychological testing. Thus, many contributions in the area of regression and correlation as well as recent writings on pattern and profile analysis have not been included. Largely because of the somewhat limited amount of material available during the past three years, papers concerned with decision theory, the discriminant functions, sequential analysis, classification, and sociometric problems were not considered except incidentally. It would seem probable that within the next three years a sufficient accumulation of material on decision theory and discriminant analysis will be forthcoming to allow inclusion of a chapter on these topics for the 1960 issue of the REVIEW.

This chapter is organized as follows: After a review of recent books in statistics that are of interest and help to research workers in education, major consideration will be given to (a) general developments in statistical theory with particular emphasis upon contributions to statistical inference involving parametric procedures; (b) recent contributions concerning chi-square and contingency tables as well as related topics; (c) nonparametric methods including some material on measures of correlation and association; (d) regression and correlation technics primarily viewed in a parametric setting; and (e) factor analysis in which, in view of space limitations, only methodological advances are treated.

Books

Altho during the period reviewed, many of the significant books pertaining to statistical methodology were devoted to experimental design, several other books in statistics were published that are of interest to research workers in the behavioral sciences. In statistical inference a potential classic is the volume by Fisher (62). Among introductory books of general scope are those by Adams (1), Dixon and Massey (52), Hoel (98), Li (122), Snedecor (178), and Wallis and Roberts (204). Of these texts the two by Dixon and Massey and Wallis and Roberts probably placed the least premium on background in mathematics altho two or possibly three years of college mathematics should suffice for comprehension of the material in any of the other volumes cited. Of all the books mentioned, perhaps the most useful one to the individual doing applied research is the revised edition by Dixon and Massey which, to say nothing of the unusual clarity of exposition of a variety of standard topics, contains 33 different tables. Other useful tables were compiled by Pearson and Hartley (148) from those appearing in various issues of *Biometrika*.

Probably the most elementary and perhaps one of the most readable statistics texts is that by Underwood and others (203). In addition, new volumes appeared by Cornell (43), Edwards (59), Tate (187), and Wert, Neidt, and Ahmann (209); they should be useful in two- or three-semester courses for upper division or graduate students in the behavioral sciences. Guilford (73) and McNemar (128) revised their well-known texts. As teaching aids to accompany the Guilford volume, Guilford and Michael (75, 76) prepared two workbooks that contain problems requiring step-by-step solutions as well as answers.

Important contributions of a more specialized nature were to be found in the areas of nonparametric statistics and factor analysis. In the former field, Fraser (65) wrote a mathematically rigorous text in nonparametric statistics which only a handful of specialists in the behavioral sciences will be able to comprehend. On the other hand, Siegel (177) prepared a comprehensive, lucid text; especially oriented to the needs of research workers in the behavioral sciences, it is probably the best current source of material on nonparametric methods for readers of the REVIEW.

In factor analysis Adcock (2) provided a brief and elementary book for the student with minimal training in mathematics. Relatively elementary and well suited to a three- or four-semester-hour course in factor analysis is Fruchter's text (66) that is essentially Thurstonian in its emphasis. An excellent chapter on factor analysis is to be found in Guilford's revised edition of *Psychometric Methods* (74), a volume which also treats several other quantitative methods from a somewhat applied point of view.

Not to be overlooked is the first volume of the *Handbook of Social Psychology*, edited by Lindzey (123), which contains several chapters on different aspects of statistical methods. Extremely useful sources of material on statistical theory and research design are the chapters that were prepared by Jones (108), Moses (138), and Gardner (67), respectively, in the 1955, 1956, and 1957 volumes of the *Annual Review of Psychology*.

Perhaps the one most intriguing book in statistical methodology during the past few years is Meehl's short but important *Clinical vs. Statistical Prediction* (131). In pitting actuarial and clinical methods against each other, the author took 20 studies in which both approaches were used to predict future behavior and compared the relative merits of each approach.

General Developments Primarily in Parametric Statistics

Outside the areas of regression and correlation and analysis of variance and covariance, published research tended to be nonparametric rather than parametric in its emphasis. Nevertheless a few noteworthy contributions to parametric theory appeared. Two highly readable papers of general interest were those by Chernoff (32) and by Tukey (202).

Chernoff presented a selective review of large-sample parametric theory. He also considered aspects of inference relative to the emphasis of the maximum likelihood principle in estimation and the use of optimal designs for estimating parameters and for testing both simple and composite hypotheses against appropriate alternatives. In his stimulating paper Tukey pointed to a number of unsolved problems of experimental statistics.

Contributions to statistical inference were made by Halperin (88) who presented charts for estimating parameters when sampling has occurred for a singly truncated normal distribution, and by Raj (153) who treated the estimation of parameters of a Type III population from singly and doubly truncated samples. Thru the use of a double sampling procedure for the estimation of population means relative to a given confidence level, Seelbinder (174) described a method for ascertaining the size of the first sample stage upon which the second sample stage is dependent; he furnished tables for determination of the optimal size for first-stage samples in terms of four different confidence coefficients. Owen (144) presented a double sampling procedure for testing the mean of a normal distribution; his method does not require so many observations as conventional single sample tests for maintenance of the same degree of power. Readily extended to the case of the difference between two means, the test was treated from the standpoint of both known and unknown standard deviations, and its use was facilitated thru accompanying tables. In certain respects these double-sampling procedures constitute a simple decision-making process not unlike a rudimentary sequential analysis. Altho the topic of sequential analysis is outside the scope of this chapter, the interested reader is referred to a comprehensive article written by Fiske and Jones (63) especially for an audience of psychological research workers.

In a comprehensive paper Proschan (151) discussed at length the similarities and differences between confidence and tolerance intervals for the normal distribution in various cases of known and unknown means and standard deviations. Noether (142) treated two confidence intervals for two different expressions of corresponding ratios of probability estimates that may be interpreted as measures of effectiveness.

In two related articles Chernoff and Lieberman (34, 35) considered the use of probability paper. In their first article, the writers presented tables for samples up to size 10 as an aid to the selection of ordinates on normal probability paper that will permit "optimum" graphical determination of the mean and standard deviation of a normal distribution. Extending their problem to the case of a general continuous distribution with finite variance that is completely specified except for location and scale parameters, the writers in their second paper stated in abstract terms necessary and sufficient conditions to guarantee optimal estimates not only of the scale parameters, but also of each of the percentiles.

Bridging to some extent the gap between parametric and nonparametric approaches are order statistics (e.g., percentiles or linear combinations thereof) used to estimate the parameters of populations of specified form. The lucid exposition of order statistics and the extensive tables furnished by Dixon and Massey (52) are adequate for the purposes of many educational research workers; in addition, important theoretical contributions to the estimation of parameters from combinations (usually linear) of order statistics appeared. In a series of closely related papers Sarhan (163, 164, 165, 166) employed order statistics in estimating parameters of various types of distributions, and subsequently Sarhan and Greenberg (167) wrote a theoretical paper concerning the use of order statistics in the estimation of parameters in singly and doubly censored samples. Relative to the problem of missing or censored observations, Sarhan and Greenberg (168) published tables for estimation of parameters for samples up to 10 in size. For samples of size 20 and less from a normal distribution Teichroew (193) reported the expected values of order statistics and of the products of order statistics, and furnished tabulations.

Additional miscellaneous contributions to statistical theory were Godwin's expository and detailed paper (69) on generalizations of inequalities of the type set forth by Tchebychef as applied to a variety of distribution functions, Tukey's suggestions (201) for maintaining simplicity in moment-like sampling computations, Sandler's arithmetical simplification (162) of the *t*-test of the significance of the difference between correlated means, and Teichroew's listing (192) of a number of unpublished statistical tables prepared by members of the Numerical Analysis Institute of the University of California at Los Angeles. Of possible interest to people in the mental hygiene field was the development by Marshall and Goldhamer (129) of three statistical models based upon application of Markov processes that may be used in the study of such variables as the age of onset of a psychosis and the age of admission to a mental hospital.

Finally mention should be made of a running controversy concerning the use of either one-tailed or two-tailed significance tests that appeared in at least seven different articles in the *Psychological Review* and *Psychological Bulletin* between 1951 and 1954. In two reviews Jones (108) and Moses (138) cited pertinent references and summarized and evaluated the arguments presented in the original sources.

Chi-Square, Contingency Tables, and Related Topics

Extending his treatment in an earlier comprehensive article (36) dealing with chi-square, Cochran (37) wrote a highly substantive paper concerning ways in which applications of common chi-square tests may be strengthened. He discussed such problems as goodness of fit, subdivision of degrees of freedom in the detection of a linear or other type of trend in a contingency table, and over-all significance tests for combinations of 2 x 2 contingency tables. After making the point that chi-square as a test of goodness of fit gives us no indication of how a null hypothesis fails because it is not directed against any particular pattern of deviations of the observed from the expected frequencies, Cochran (38) suggested a new procedure called the *L*-test, which is a linear function of the deviations between a set of observed frequencies and another set of corresponding frequencies so chosen in advance that *L* will be sensitive to the alternative hypothesis thought most likely to hold. Altho approximate except in the asymptotic case, the *L*-test can be made responsive to any specified pattern of deviations with respect to either their signs or magnitudes.

An important paper also concerned with goodness of fit was that by Chernoff and Lehmann (33) who demonstrated that chi-square for grouped frequencies follows the calculated chi-square distribution provided the estimates of the parameters employed in the calculation of expected frequencies constitute maximum likelihood estimates. When the sample mean and standard deviation are used in the test for normality of distribution, there is a tendency for the value of chi-square to be overestimated especially in the instance of a small number of cells. In a recent short article concerning the interpretation of chi-square tests with respect to a study of the preference of 31 subjects for two drugs administered on two occasions, Armitage and Healy (8) compared goodness-of-fit tests and variance tests with exact tests and showed in their tabulation that the probability values closest to the .05 point turned out to be .018, .064, and .0415, respectively, for the three approaches.

Berkson (16), dealing with a rather specialized problem in bio-assay work involving the logistic function, reported the results of a series of experiments that cast doubt upon the widely held view of the efficiency of maximum likelihood estimates when compared with the minimum Pearson chi-square estimates. In particular his findings conflicted with the more or less commonly accepted principles that (a) a sufficient estimator is either unique or functionally related to a maximum likelihood estimator and (b) the maximum likelihood estimator in the instance of asymptotically efficient estimators will extract the greatest amount of information from the data.

Significance Tests

Relative to the performance of significance tests of individual 2 x 2 contingency tables, several helpful papers were published. Applicable not only to fourfold tables, but also to those problems the data for which are compared with the chi-square model, are the important tables prepared by Lewis (121) that furnish the 0.1 and 99.9 percent points of chi-square over an extensive range of degree of freedom. Tables prepared by Finney (61) are useful in yielding an exact test of association for 2 x 2 tables at .05, .025, .01, and .005 levels of significance in the instance in which both frequencies present in one of the margins are less than or equal to 15; Latscha (120) extended these tables so that both marginal frequencies go up to 20. In the instance of a 2 x 2 contingency table that includes up to a total of 50 observations Armsen (9) provided, for both one-tailed and two-tailed tests at the .05 and .01 levels, a set of exact probability tables derived from use of a hypergeometric formula.

Making use of binomial coefficients instead of factorials in order to shorten the calculation of exact probabilities for either 2 x 2 or 2 x r contingency tables, Sakoda and Cohen (160) furnished a table of binomial coefficients accurate to four significant figures for n between unity and 60 as well as a set of inequalities for estimation of cumulative probabilities in the tail of the binomial distribution relative to a given set of entries in a contingency table. Another group of tables very useful when the proportions p_1 and p_2 of individuals in each of two samples belonging to a given category are very small (altho the numbers of individuals N_1 and N_2 in the two samples are relatively large) was prepared by Patnaik (146) on the hypothesis that the two samples are drawn from a common Poisson population.

Quick graphical methods for the evaluation of the significance of entries in 2 x 2 contingency tables were described in two papers by Bross and Kasten (26) and by Trites (197). In the first mentioned paper, charts are furnished that permit both one-tailed and two-tailed significance tests without the need for calculation of chi-square provided the proportion of cases in either of two samples being compared is between .10 and .90 of the combined number of cases in the two samples. Altho minimizing computational effort, the sets of curves in the second paper are strictly applicable only when the numbers in each of the two samples are the same.

As to significance tests involving proportions and percentages Gengerelli and Michael (68) proposed a procedure for evaluating the reliability of the difference between proportions and for setting up confidence intervals. In a paper also concerned with the estimation of binomial parameters Bross (24) devised a method based on the construction of a confidence interval for ascertaining whether a sample proportion p_2 is significantly larger by a certain percentage than another sample proportion p_1 as given by $\Theta = 100\ (p_2 - p_1)/p_1$ upon the assumption that both p_1 and p_2 are sufficiently small and that the samples are sufficiently large to permit use of a Poisson approximation.

Crow (46) described how confidence intervals could be established for a proportion. Rao and Chakravarti (155) developed significance tests for the Poisson distribution in the case of small samples.

Combining Independent Tests of Significance

For the important problem of evaluating a series or combination of independent significance tests, Jones and Fiske (109) proposed and described in detail a binomial model and a chi-square model involving a logarithmic transformation of the product of the independent probabilities *p* associated with each of the *k* number of independent significance tests. That each of the sets of measures must be independent was emphasized in application of the models altho substitute procedures were suggested when statistical independence could not be assumed. Well adapted to the calculation of numerical values of chi-square arising from use of the second model was a set of 2 x *k* tables prepared by Gordon, Loveland, and Cureton (71). Perhaps of even more help was the appearance of two nomographs prepared by Sakoda, Cohen, and Beall (161) that furnish chance probabilities of obtaining *n* or more statistics significant at the .05 or .01 levels, respectively, from *N* calculated statistics.

For the situation in which an investigator wishes to test the over-all significance of a set of 2 x 2 contingency tables, Yates (215, 216) cited reasons why he believed the previously mentioned combination of probabilities test (which is compared with the chi-square distribution consisting of 2 *k* degrees of freedom) is not too efficient relative to a maximum likelihood solution involving the use of some appropriate transformation, but nevertheless concluded in his second paper that "chi-square without correction for continuity will give one-tail probabilities for 2 x 2 tables which may be safely combined in most cases" encountered in practice. In his previously cited paper Cochran (37) considered the circumstance in which the investigator is interested in ascertaining an over-all trend of differences in a series of independent pairs of proportions arising from some natural ordering of events and proposed a significance test for the corresponding combination of 2 x 2 contingency tables, a test that anticipated an equivalent procedure suggested by Armitage (7).

Writing a comprehensive theoretical paper concerning the combination of independent tests of significance, Birnbaum (17) evaluated several different approaches that had been proposed and concluded that since no single method of combination is in general optimal, attention should be given to the kinds of tests to be combined in the selection of a method. However, for one kind of common problem it was shown that methods by Fisher and by Tippett possessed an optimal property. Finally for the reader desirous of an overview of the problem of combining independent tests of significance, the detailed three-page discussion by Mosteller and Bush (140) may well be the most helpful single source.

Miscellaneous Developments

Two noteworthy contributions regarding the separation of the total chi-square in contingency tables into components may be briefly cited. Kimball (118) proposed short-cut computational formulas that allow the partition of the chi-square value in a multifold contingency table of r rows and s columns into the chi-squares associated with various (r — 1) (s — 1) individual 2 x 2 tables. After drawing an analogy between factorial experiments involving use of analysis of variance and multiple contigency tables in which the nature of measurements prevents their being scaled, Sutcliffe (185) furnished a model for the partition of chi-square in multiple contingency analysis into components associated with each of the main effects and with various orders of interaction, a model which is detailed relative to different types of restriction dependent upon whether parameters are known or estimated.

Bross (25) indicated that when errors of classification arise in 2 x 2 tables as in clinical diagnosis, such errors may be relatively more serious in their influence on the estimation of parameters than is their attenuation of the accuracy of significance tests (as in the instance of the difference between two sample proportions) altho the power of the significance test will suffer. For the situation in which frequencies are missing in contingency tables, Watson (206) proposed a "missing value" formula based on the principle of maximum likelihood to compute estimates for all unavailable frequencies and also considered the problem of "mixed-up" frequencies.

What may be considered a critical overview of the use of contingency tables will be found in a paper by Goodman and Kruskal (70) and in one by Mayo (130). The first two writers in a lengthy discussion proposed several new indexes for contingency tables (i.e., those of multiple and partial association in more complex arrangements) and distinguished between ordered and unordered variables and symmetric and unsymmetric problems upon the assumption of no underlying continuum being present. Mayo (130) considered some recently developed technics for the analysis of association in contingency tables, illustrating his procedures with data from a follow-up survey of education graduates. He discussed approximate tests of significance for detection of departures of a specified type such as the presence of correlation or regression in certain parts of a contingency table, tests of higher order interactions, and exact tests of significance in the instance of small sample data or in the case of the presence of small or even zero theoretical frequencies in contingency tables.

In order to meet the condition in which nonindependence of the marginal distribution of a two-way *m* x *m* classification may exist, Stuart (184) devised a large sample test for the homogeneity of two marginal distributions. In still another paper in which the presence of correlation is an important factor Stuart (181) furnished a means for comparing the frequencies (with respect to possession of a given attribute) in matched samples.

Several papers concerning Poisson processes and the binomial distribution appeared in addition to those previously cited. In a comprehensive article Birnbaum (18) described and illustrated statistical methods that can be applied to Poisson and experimental processes. For samples that are truncated and censored, Cohen (39) proposed maximum likelihood estimates of Poisson parameters and explained how existing tables could be used to apply the formulas to practical problems. As a means of stabilizing variances and normalizing distributions Blom (21) compared various transformation procedures for the binomial, negative binomial, Poisson, and chi-square distributions. To describe the theoretical extent of accident proneness in terms of two independent periods of accident observation, Webb and Jones (208) proposed what they believed to be two operationally comparable models, the Poisson distribution and the binomial bivariate (correlation) method, the mathematical equivalence of which was proved by Burke (27). In addition, striking relationships to the Spearman-Brown reliability estimate were demonstrated.

Developments in Nonparametric Statistics

In addition to the previously cited writings on nonparametric statistics by Siegel (177) and by Mosteller and Bush (140), mention should be made of a very simple, lucidly expressed, nontechnical article by Siegel (176). Several other general contributions to the logic and theory of nonparametric statistics that either represent important advances from a mathematical standpoint or suggest problems in need of solution should be cited.

Using set theory, Bahadur and Savage (11) demonstrated the absence of certain statistical procedures in nonparametric problems. It was argued that if the distribution of a real random variable in a population is totally unknown, little or no information about the tails of the population can be furnished by a sample even if it has been drawn according to a sequential method. In their treatment of problems of inference about the population mean the writers pointed out that no effective test of the hypothesis of the population mean being equal to zero can be made, that no confidence interval can be established, and that no point estimate is possible since the parameter is sensitive to the tails of the population distribution. Concerned with the glibness or apparent lack of interest that statisticians show in treating ties in nonparametric procedures, Putter (152) showed that when ties are considered as being random variables as compared with their being treated as nonrandomized variables, the exact power and asymptotic efficiency of the tests are reduced. In essence he proposed a nonrandom model for treatment of ties.

In a valuable theoretical paper on rank order statistics Savage (170) pointed out that in nonparametric work it is seldom possible to apply all the basic ideas and related concepts pertaining to the testing of alternative hypotheses underlying the parametric procedures of Neyman and Pearson since for many of the alternatives considered in nonparametric methods neither optimum critical regions nor analytic technics for determining power functions may exist. For the two-sample case Savage considered alternatives involving monotone likelihood ratios and presented a necessary criterion for admissibility. Another theoretical contribution was Dwass's paper (57) concerning the distribution of ranks and of chosen rank order statistics. Subsequent to developing the moment generating functions associated with two sets of independent sets of ranks from two possibly different populations, he showed the Wilcoxon statistic to be a special case of the general distribution statistic of rank orders and demonstrated that for certain combinations of sample sizes and parent populations the limiting distribution is nonnormal.

Tests of Significance

As might be expected, several new nonparametric significance tests or adaptations of existing tests appeared. In the comparison of two samples for significance Moses (139) proposed a test, based on the ranks of observed values, that is sensitive to the presence of extreme scores (either large or small or both large and small). The test was devised to take care of the situation involving experimental and control groups in which the effect of the experimental variable may be reflected by an increase in the scores of some subjects and by a decrease in the scores of other subjects. Employing a criterion based on the rank ranges of two samples, Kamat (117) presented a new distribution-free test for samples with respect to which it is assumed that no difference exists in the location parameters of the two population distributions.

For the circumstance in which two variables are measured on each individual, Hodges (96) developed a bivariate analog of the two-sided sign test. In testing the null hypothesis that the bivariate distribution for one pair of variables (x_i, y_i) is identical with that of a second pair of variables (x_1', y_1') on the assumption that individual vectors are independent, attention is directed toward whether in a second circumstance the bivariate distribution has shifted relative to its position in the first circumstance in a direction generally the same for all individuals. In presenting a new distribution-free test along with appropriate tables of significance and power for the hypothesis that given values exist for all regression parameters, Daniels (49) assumed that the probability of the signs of the independent residuals being positive (or negative) is one-half. Altho his test statistic was determined explicitly for two parameters, it can be extended in principle to any number of variables.

Several modifications in, or additions to, existing significance tables appeared. To assist the research worker who wishes to make use of the *G*-test (an approximation to the *t*-test, the denominator of which is replaced by the average range of the combined number of samples *m*). Jackson and Ross (103) presented a set of tables that yield 10, 05, and 01 percentage points in two-tail tests for situations permitting various numbers of *m* random subgroups each of size *n*. For a nonparametric test of location Rosenbaum (159) prepared an extensive set of tables that merely involve a count of the number of points in one sample that fall outside an extreme value of the second sample. For determination of significance probabilities associated with the Wilcoxon test, Fix and Hodges (64) furnished tables that cover a range between 2 and 12 for the smaller sample size. Percentage points for the Kolmogorov statistics are available in a table prepared by Miller (134). In the instance of a distribution-free test of goodness of fit, Anderson and Darling (6) tabulated large sample significance points.

Power and Efficiency

The problem of the power and efficiency of nonparametric tests was the stimulus for several studies. In a comprehensive paper on the asymptotic efficiencies of five two-sample nonparametric tests against normal alternatives to the null hypothesis, Mood (135) determined asymptotic efficiencies of $3/\pi$ (about 95 percent), $2/\pi$ (about 64 percent), and zero, respectively, for the Wilcoxon test for location, the median test for location, and two run tests. For a square rank test of dispersion an efficiency of $15/2\pi^2$ (about 76 percent) was reported.

For samples of various sizes Dixon (50) tabulated the power functions of the sign test when α is near .05 and .01 and employed a power efficiency function, which is the ratio of the size of sample drawn from a normal population when the *t*-test is used to the size of sample in the nonparametric test if equal power is maintained relative to a given alternative. The tabulated results demonstrated that the power efficiency decreased as the size of sample increased, as the level of significance increased, and as the extent of departure δ of the alternative hypothesis from the null hypothesis increased. A second paper by Dixon (51) concerning the power efficiency of four nonparametric tests for two samples of size $m =$

$n = 3, 4, 5$ against normal alternatives revealed, in terms of exact results, that the most efficient test is the Wilcoxon (rank sum) test followed by the Kolmogorov-Smirnov (maximum absolute deviation) test, and the median test. As the value of the alternative hypothesis becomes more remote from that of the null hypothesis, the efficiency tends to drop only slightly, but relatively more for the first two tests than for the median test.

In studying the efficiency of nonparametric competitors of the *t*-test, Hodges and Lehmann (97) showed that the asymptotic efficiency of the two-sample Wilcoxon test relative to the *t*-test never falls below .864 and obtained the limit of a sequence of power efficiency functions for the sign test with respect to *t* in normal populations as the size of samples becomes infinite. In other theoretical papers Tsao (199) proposed methods to approximate the distribution of ranks that could be used as a basis for the evaluation of the power of an arbitrary rank test, and Dwass (56) studied the large-sample power of certain rank order tests in two-sample problems against alternatives involving one parameter.

In an empirical study of the power of the rank, median, and run tests in which ties are numerous Tate (186) found that the degree of power was highest for the rank test, slightly lower for the median test, and extremely low for the run test. A related contribution was that of Teichroew (191) who furnished empirically derived tables of power functions of any rank order test of the hypothesis that the two samples come from the same population when the sizes of the two samples are 2 and 3, 3 and 3, 2 and 4, or 3 and 4.

Tests of Randomness

Concerning nonparametric tests for the hypothesis of randomness in a sequence of values several important contributions were made. Perhaps of greatest theoretical interest was Savage's demonstration (171) of the independence between rank order statistics and symmetric statistics such as the *t*-test. He concluded that if random variables are independently and identically distributed as in random samples, the statistics employed to test randomness and parametric features of the null hypothesis continue to be independent even tho the parametric parts of the null hypothesis may be false. For example, one might test a set of observations for both randomness and normality. The nonparametric test of randomness would probably depend upon an alternative of interest relative to which a form of rank order correlation would be appropriate. However, the test of normality in which the classical chi-square test of goodness of fit should be employed involving the estimation of one parameter would be completely independent of the nonparametric test of randomness.

Among related papers of interest upon randomness was one by Stuart (183) who presented tables of the asymptotic relative efficiencies of various tests of randomness against normal regression alternatives. Thru making use of Kendall's tau coefficient, Jonckheere (106) not only obtained a general statistic S that could be used to test the extent of agreement between hypothesized rank-order values for n objects or scores and an entire set of observed rankings of the same n objects or scores by m judges, but also furnished a useful group of tables. As an alternative statistic Lubin (127) proposed one he designated as J as a rank order test for trend in correlated means.

To test the hypothesis of randomness of sequence of N observations, or equivalently the hypothesis that N independent random variables possess the same continuous distribution function, Cox and Stuart (45) presented several practical quick sign tests for trend in location and dispersion altho they pointed out that even their best tests, which may be preferable to other simple tests in the literature, are less efficient than the rank correlation tests. In a subsequent note Cox (44) suggested that when an inefficient quick test is compared with an efficient test such as t, consideration should be given to the extent to which agreement is found in the application of the two tests to the same set of data. In describing a model based on the distortion of a sequence of random values, Barton and David (13) suggested its use as an alternative to the hypothesis of randomness, applied it to Spearman's rho coefficient, and stressed its usefulness as an alternative to the random sequence associated with any bivariate criterion.

The Tau Coefficient

The nonparametric coefficient of association, Kendall's tau coefficient, was the object of extensive study. Haberman (87) described distributions for the coefficient that were based on partially ordered systems. Previously Stuart (180) succeeded in establishing bounds for the sampling variance of the coefficient. With no assumptions about the nature of the scales of measurement (other than for the existence of ordinal values), the shapes of distributions involved, or the comparative standing or variability of different subgroups, Torgerson (196) generalized Kendall's test of association between two sets of rank orders to the case in which the total sample consists of several subgroups of variable sizes and in which data on one or both of the variables to be correlated are made up of rank orders within each subgroup. Moreover, he demonstrated thru two empirical examples that a normal approximation to the exact test of significance will suffice in most practical situations. Both Torgerson (196) and Adler (3) proposed methods for handling ties. Challenging Schaeffer and Levitt (172) who in their comprehensive review of the literature on Kendall's tau coefficient stated that "generally applicable tests of the significance of any partial τ are not yet available," Jones (110) presented a significance test in the instance of a partial tau relative to which the partialed-out variable is nominal in its scale properties.

Noteworthy advances were made in the development of improved methods of computation of tau such as the simplification proposed by Bright (23) and Cartwright (29). Reducing the labor involved in Bright's approach, Griffin (72) described a graphic method for calculation of the coefficient.

Several miscellaneous developments in nonparametric methods of interest to research workers in education and psychology were those of Jonckheere (107) who described a test of significance of the relationship between the predicted grading of n objects into k ordered categories and the corresponding rankings of the n objects by m judges, and of Cartwright (30) who developed a quick estimate of multijudge reliability. Cureton (48) developed a formula for rank-biserial correlation which was shown to be equivalent to both Kendall's tau and Spearman's rho coefficients. Stuart (182) demonstrated that for samples drawn from normal and from uniform distributions the correlations between variate values and ranks are .94 and .96, respectively, when N is equal to 25; the correlations have .98 and 1.00 as upper bound values as N increases.

Regression and Correlation

In correlation and regression theory a variety of problem areas was studied. In distribution theory Dunnet and Sobel (53) considered a multivariate generalization of Student's t distribution, and in treating the bivariate case in detail, obtained exact and asymptotic expressions for the probability integral as well as an asymptotic expression for certain percentage points. In a comprehensive paper on multivariate distribution theory Olkin and Roy (143) derived the sampling distributions of a broad group of statistics directly from the probability law for random samples drawn from a multivariate normal population; they showed the application of their new derivation to situations concerned with canonical correlations and multiple and partial correlations.

Another important contribution to multivariate analysis was Pillai's proposal (149) of three new test criteria that were based on the characteristic roots of matrices derived from the product-moment matrices corresponding to samples chosen from multivariate normal populations. The approximate distributions of the statistics concerned were seen to conform to those of Type I or Type II Beta. In line with his statement that the distribution laws of random variables are possibly relative to the assumption of an appropriate kind of stochastic dependence on linear statistics, Laha (119) was able to characterize the normal distribution in terms of the properties of both linearity of regression and homoscedasticity of suitable linear statistics. The distribution of the regression coefficient in samples arising from a nonnormal population was the subject of a study by Hill (95) who in addition investigated the influence of departures from normality upon the significance levels furnished by two t-tests involving the regression coefficient. It would appear in the instance of samples of size 11 or larger that the magnitudes of the discrepancies attributed to nonnormality are constant and determinable from calculation furnished by knowledge of six cumulants. Finally, Harley (92) demonstrated a functional relationship between the distribution of noncentral t and an expression for a transformed correlation coefficient that arises from a population in which the correlation is zero.

Parameters

The estimation of parameters in correlation and regression theory was a problem central to a number of papers. Using the method of maximum likelihood, Cohen (40) estimated the parameters of the bivariate normal distribution from restricted samples that arise when certain individuals have been eliminated in the selection process, and also illustrated his procedures. In the instance of the trivariate normal population both Edgett (58) and Lord (124) independently employed maximum likelihood estimators for determination of the parameters when some of the sample observations for one of the variates are missing and found explicit solutions to the maximum likelihood equations. Another application of the principle of maximum likelihood for a multivariate normal distribution when some of the observations are absent was subject to abstract discussion by Anderson (5) for the simplest case concerning the bivariate normal distribution. For the situation in which all individuals in the population have fixed, identical values in each of the independent variables X_1, X_2,—, X_k, Johnson (104) derived both a best linear estimate of the true mean score on the dependent, or predicted, variable, which was in essence an average of all predicted values, and a standard error of estimate.

Confidence Intervals

Determination of confidence intervals in estimation problems involving regression was the subject of papers by Durand (54) and by Crow (47). After discussing the nature of two fallacies usually committed in the determination of conventional confidence intervals for the partial regression coefficients of the multiple regression equation, Durand proposed a possible remedy thru the use of joint confidence regions that would seem more suitable to regression problems involving the estimation of several parameters. For the ordinate of the regression line or surface, Crow formulated a generalization of the confidence interval that permits the independent variable to assume values at random.

Serial, Biserial, and Point Biserial Coefficients

Important theoretical considerations concerning the biserial and the point biserial coefficient were treated in three papers by Tate (188, 189, 190). Altho his findings are too numerous to be cited in detail, a few points may be mentioned. In his first paper Tate showed that the point biserial coefficient is t distributed when the parameter is equal to zero; in his second article he proved that the asymptotic variance was a minimum for a fixed value of the parameter in the instance of a 50-50 split in the dichotomized variable; and in his third presentation the writer in citing applications of correlation models for biserial and point biserial coefficients compared the circumstances under which one of the coefficients would be preferred to the other; he recommended that if any doubt regarding the feasibility of a biserial coefficient should exist, one should then make use of the point biserial coefficient.

In a group of closely related papers on serial correlation Hannan (89, 90) and Watson (207) investigated the correlation of errors in a series of ordered observations. In the second cited paper Hannan not only described an exact test for the serial correlation present in residuals from the regression, but also developed an estimator of the regression coefficient. Watson showed that if the errors in the covariance matrix are independently and normally distributed in a homogeneous manner, an hypothesis regarding regression coefficients could be evaluated thru use of a test statistic with t or F distributions. Recently, in still another paper, Hannan (91) described how serial correlation may be tested for in least squares regression.

Regression Analysis

In the area of regression analysis several contributions that might be viewed as somewhat more applied than theoretical were made. Guion (77) presented a workable solution to the prediction of a quantitative variable from a weighted combination of qualitative or categorized variables and illustrated his procedures altho significance tests were not cited. In the instance of a two-way classification in the dependent or criterion variable, Michael and Perry (133) demonstrated both algebraically and numerically the comparability of the simple discriminant function and multiple regression technics. Thru a large-scale empirical study involving selection devices in education, Sevier (175) tested the assumptions underlying multiple regression and concluded that while the existence of both linearity and homogeneity could usually be justified, there was considerable doubt as to the tenability of the assumption of normality.

Computational Aids

Many computational aids in the form of short-cut numerical procedures, nomographs, charts, and tables appeared that should be of considerable service to individuals in applied statistics. In the area of multiple regression analysis Moonan (136) provided an arithmetically simple procedure for giving a quick estimate of a multiple correlation coefficient and verified empirically the feasibility of its use. It would seem to work best when the intercorrelations among the predictor variables are relatively homogeneous. Another contribution to multiple regression analysis was Lord's nomograph (125) for calculating the multiple correlation when there are two predictor variables.

Employing the criterion of least squares, Askovitz (10) developed a short-cut graphical procedure for fitting a straight line to a series of points, provided they are equally spaced on the axis representing the independent variable. To fit an asymptotic regression curve, Patterson (147) proposed a simple method. For the computation of correlations based on Q-sorts

Cohen (41) derived a useful equation and published a corresponding nomograph.

From four theorems stated by Reiersøl (157) showing the relationship of sign properties of zero-order correlation coefficients to those of partial correlation coefficients, logical deductions could be made regarding what the signs of partial correlation coefficients should be. Michael and Caffrey (132) described tables to facilitate calculation of first-order partial correlation coefficients. Perhaps one of the most useful groups of correlation tables is the set that Owen (145) prepared for computation of bivariate normal probabilities.

A special correlation procedure was derived by Winer (210) to indicate the amount of interrelationship between overlapping groups of individuals several of whom may belong to two or more groups in an organization of complex structure. The index proposed, which is equivalent to a product-moment coefficient, is not only lacking in certain indeterminancies usually inherent in the creation of fourfold tables pertinent to organizational analysis problems, but also fairly insensitive to the absolute size of totals in the margins of fourfold tables.

Factor Analysis

During the period July 1, 1954, to July 1, 1957, there was no lessening of interest in factor analysis as a research technic. So overwhelming was the number of papers that only a few of the most important methodological contributions can be reviewed.

Communality Estimation

The communality problem, the resolution of which is essential to the proper application of factor analytic methods, has probably been attacked with more vigor than during any previous three-year period since Spearman launched factor analysis more than 50 years ago. A truly major addition to the not inconsiderable literature concerning communalities was that of Rao (154) who answered two statistical questions. First, how can an estimate be obtained of the minimum rank of the variance-covariance matrix of the common parts of the tests, that is, of the so-called reduced correlation matrix? Second, how can the hypothesis that the rank of the population matrix is less than or equal to this estimated rank be tested against the alternative that it is greater? Thru applying the theory of canonical correlation to obtain a vector basis for a common-factor space Rao was able to answer the questions posed and to show that his approach furnishes one of several possible solutions to Lawley's well-known likelihood equations. Altho a firm statistical basis was furnished for determining a common-factor space of a testable number of dimensions, the calculations involved in Rao's procedures for a correlation matrix of even moderate size appear to be almost beyond the practical capabilities of most available electronic computers.

Altho many years ago Guttman (83) demonstrated that under rather general conditions the communality of a variable is equal to its squared multiple correlation on the remaining variables in the battery as the number of these variables becomes arbitrarily large, more recently he (78) reviewed four approaches that have been used to approximate communalities and gave a series of theorems and most compelling arguments for using as a best possible approximation his well-known lower bound, the squared multiple correlation. Recently Guttman (85) offered simple proofs of relations between communalities and multiple correlation properties. In another paper Guttman (82) proposed improved bounds for communalities, and more recently he (79) modified a well-known criterion to achieve communalities that maximize determinancy.

In stipulating the composition of hypothetical variables beyond those in the immediate battery, Tryon (198) and Kaiser (115) attempted to calculate the squared multiple correlation in the limit. Their results appear to be somewhat encouraging. With no a priori specification of rank, they seemed able to obtain a solution for unknown unique minimum rank communalities. Additional work by Kaiser (112, 113) indicated that the Tryon-Kaiser approach breaks down when minimum rank communalities are not unique, a circumstance which will invariably arise in practice.

From an examination of the ordinal properties of the factor-analytic model Bennett (15) set forth a method for determining the dimensionality of a score matrix, and Warburton (205) proposed a return to Hotelling's original formulation concerning the use of unities as communality approximations. In one of his final papers Thurstone (195) suggested that the arbitrary factoring of a correlation matrix be carried out according to the criterion that the factors to be extracted minimize the sum of the squares of the off-diagonal residual covariances. Altho not computationally feasible, this method of factoring does not require that communalities be known or even approximated; they fall out as an ex post facto byproduct of the factoring procedure.

In relation to the frequently used statistical procedure of separating a set of data or scores into two or more parts, Harris (94) showed that in factoring, use of unities in the diagonal cells and employment of communalities leads to a separation of the data into two orthogonal parts. Subsequently Harris (93) was concerned with the development of a transformation procedure for deriving factors based on communality estimates from those obtained when unities are employed, a procedure which, when applied to observed data, yields common factors that are consistent with Lawley's requirements for a maximum likelihood solution.

In two truly heroic efforts Wrigley (211, 212), with the aid of an electronic computer, attempted to follow thru on textbook recommendations that an ideal factoring procedure would be to compute iteratively principal axes for a given number of factors until the communality approximations converge. His results were not encouraging. With a correlation matrix of order 11, hundreds of successive principal axes solutions were necessary.

Not only did different solutions result from different initial approximations, but also in the matrix selected for investigation the Heywood case (a value for a communality in excess of unity) occurred more often than not. In a nonmathematical article Wrigley (213) discussed in detail some distinctions between common and specific variance and concluded that the most nearly appropriate approximation to the communality of a test is indeed Guttman's lower bound altho he indicated that it would be desirable to examine more closely Rao's statistical procedures.

From a purely algebraic viewpoint Guttman (86) considered the general question of rank reduction of correlation matrices when communalities are used. His most interesting finding was that there are classes of matrices, the rank of which may be reduced by only one—a development revealing that the implications of some earlier work by others on rank reduction are, in fact, false.

After reviewing the major mathematical results on the communality problem thru 1956, Kaiser (112) concluded that the traditional minimum rank formulation of the problem is inadequate and that Rao's recent statistical work (154) provides the essential missing ingredient to a problem improperly considered algebraic. Kaiser also delineated the psychometric approach to the communality problem which he described as the drawing of inferences regarding a universe of psychological variables from a particular representative sample or battery of variables chosen from this universe.

Rotation

One of the most exciting developments in factor analysis during the period reviewed was the rise of analytic rotational criteria that yield unique and objective solutions as contrasted with the subjectivity of graphical procedures. The first of these analytic criteria was proposed by Carroll (28), whose paper was reviewed in the December 1954 issue of the REVIEW. Subsequently a large number of related papers appeared, including one by Thurstone (194) yielding a semianalytic solution that was also cited in the December 1954 issue of the REVIEW.

Neuhaus and Wrigley (141) developed what was referred to as the "quartimax" method in which it was suggested that the "distribution" of squared loadings should be maximum as a means of achieving simple structure. Simultaneously Saunders (169) presented his "maximum kurtosis" criterion for orthogonal factors in which the kurtosis of the "distribution" of factor loadings and their reflections should be a maximum. Based on an analogous situation in information theory, Ferguson's proposal (60) was that an ideally parsimonious factor matrix is one in which the sum of the fourth power of the loadings is maximized. Amazingly in the orthogonal case, the criteria of Carroll, Neuhaus and Wrigley, Saunders, and Ferguson are all mathematically equivalent.

The problem of achieving an analytic criterion for the oblique case proved to be considerably more laborious. Because the form of his criterion explicitly concerns interfactor relationships, the version proposed by Carroll was perhaps the most easily generalized for nonorthogonal factors. Kaiser (114) developed a mathematical solution of Carroll's criterion for the oblique case. Almost simultaneously Pinzka and Saunders (150) effected a slight modification in Saunders' orthogonal criterion that made an oblique solution possible.

Noticing a systematic bias in the orthogonal quartimax solutions as a mathematical explication of simple structure, Kaiser (111) proposed his "varimax" method. He argued that the quartimax method, rather than simplifying the loading profile of a factor, concentrates its attention on simplifying the factorial composition of a test. Consequently, he revised the quartimax method by requiring that the variance of the squared loadings be maximized by factors rather than by tests. His numerical results support his hypothesis. Later Kaiser (116) improved the psychometric invariance properties of his criterion thru carrying out rotations with respect to normalized loadings. By requiring that the sum of the covariances of the squared loadings between all possible pairs of factors be minimized, Kaiser (111, 116) outlined the generalization of his varimax criterion to the oblique case.

Probably the best intuitive explanation of the notion of simple structure yet to appear was given by Tucker (200) in an introduction to his most recent semianalytic procedure. An interesting variant of the simple structure theme was presented by Schmid and Leiman (173) who proposed a "hierarchical ordering of factors." Altho a typical solution contains several more factors than the traditional Thurstonian approaches that make use of simple structure, it reveals simultaneously both simple structure and bifactor patterns while maintaining orthogonal axes.

Factorial Invariance

To the psychologist perhaps the final test of the efficacy of factor analysis for the scientific study of the internal structuring of correlated variables is the notion of factorial invariance. Ahmavaara (4) published a definitive monograph on the effect of selection. He provided methods of computing transformation matrices aimed at the problem of comparing different factor studies and applied his procedures in some detail to Thurstone's classic studies of primary mental abilities. In his monograph Rasch (156) also considered the stability of factor loadings under changes in population. Another methodological paper on invariance was that of Barlow and Burt (12), who contended that two factors may be viewed as identical if, when the persons are the same, the two sets of factor-scores are identical, or if, when the tests are the same, the two sets of factor loadings are identical.

Extending their earlier notion of "parallel proportional profiles" to the general case, Cattell and Cattell (31) were effectively concerned with finding the unique transformation matrix for rotational purposes on the basis of two experimentally independent studies of the same variables relative to which the effect of selection is systematically varied. Another noteworthy paper was that of Wrigley and Neuhaus (214) who considered the matching of two sets of factors.

Inverse Factor Analysis

Interest in the problems of inverse factor analysis continued. In considering conditions under which Q and R technics are convertible, Block (20) concluded that homogeneity of interaction between variables should exist for all individuals, and in another paper Block (19) argued in favor of forced rather than unforced Q-sorting procedure. Also comparing R and Q technics in the factor analysis of four groups of geometrical solids, Lorr, Jenkins, and Medland (126) found that a two-way factor analysis may be meaningful if not preferable to reliance on one method. How Q-sorts may be used as a rating technic in various educational and personnel settings was discussed in an expository paper by Morsh (137).

Computational Procedures

Computational savings in factoring relative to an existing simple structure hypothesis were described in two papers by Horst (99, 100) and in one by Horst and Schaie (101). Rodgers (158) devised a fast approximate algebraic rotational procedure, and in inverse factor analysis Bass (14) reported a quick iterative means for clustering persons.

Among other noteworthy developments in factor theory were two papers by Guttman (81, 84), in the first of which he described a generalized simplex for factor analysis and in the second of which he developed a simplified formula for matrix factoring. In a brief note Durand (55) explained and illustrated the inversion of a matrix by a square root method.

Miscellaneous Developments

The determination of factor scores for individuals was the subject of a long and comprehensive paper by Guttman (80) who made a definitive examination of the problem. His interesting, tho not encouraging, findings revealed that for the same observed data alternative sets of such scores are usually available that exhibit little relationship to one another.

Finally mention should be made of the important five-day international colloquium in factor analysis held in Paris during July 1955, under the auspices of the *Centre National de la Recherche Scientifique* and the Rockefeller Foundation. The roster of 59 participants was internationally representative of different theoretical viewpoints and of such diverse fields of application as psychology, education, sociology, biology, and medicine.

Published in a book entitled *L'Analyse Factorielle et Ses Applications* (42), the proceedings include 23 main papers, discussions, and resumés. Containing a singularly complete coverage of virtually the entire discipline of factor analysis, the volume affords critical comparisons of technics and rationales that would be of interest both to the unsophisticated and to the mature student in the field.

The theoretical papers, which comprise about half the volume, offer an intensive and extensive treatment of current variations in conceptual and methodological approaches to factor analysis. Several of the theoretical papers include excellent historical reviews concerning the development of factor analytic technics that serve to delineate in detail the empirical bases for the divergent practices among the British, the Continental, and the American groups. In short, the individual who is interested in acquiring an overview of the current research being done in factor analysis will probably find this volume to be the best single source.

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CHAPTER IX

Data Processing: Automation in Calculation

CHARLES WRIGLEY*

A WIDE variety of computational aids is currently available to educators, ranging from slide rule and desk calculator to punched-card equipment and electronic computation. In this review particular attention will be given to electronic computation, for several reasons: (a) The electronic computer will probably be the preferred aid in extensive calculations whenever available; (b) the machines require the more radical changes in research methods; and (c) the area is less known. But since much large-scale educational calculating is currently done with punched-card equipment, developments in that field will thereafter be briefly summarized.

Much of the computational literature deals with topics, such as numerical analysis, computer logic, computer engineering, scientific applications, and business applications, which possess no specific reference to education or psychology. Instead of trying to make a comprehensive survey of these fields, the policy will be followed of supplying certain key references, generally themselves well documented and of recent date, which provide starting points for any reader wishing to explore further.

Sections of the review are bibliographies, journals and professional societies, types of computers, digital computers, computer availability, programing an electronic computer, numerical analysis, computer use in education and psychology, factor analysis, punched-card procedures, other computational aids, and the brain-machine analogy.

Bibliographies

Devoe (32) prepared an unpublished bibliography on the use of computers in psychology (45 titles). Abstracts of the general computer literature appear in *Mathematical Abstracts*, *Mathematical Tables and Other Aids to Computation*, and *IRE Transactions on Electronic Computers*. The latter journal has an annual review of computer progress which includes extensive references (58, 81). The most comprehensive bibliography is the IBM one on use of punched-card machines in science, statistics, and education. The latest edition, compiled by Alsop, Flanagan, and Hankam (3) in 1956, has 762 references. These pertain chiefly to conventional punched-card equipment, but there is a scattering of references relating to electronic computers. Casey and Perry (21) included a 276-item bibliography in their discussion of punched-card methods in science and industry.

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Professional Societies, Journals, and Reference Works

The first journal devoted specifically to computation was *Mathematical Tables and Other Aids to Computation*, first issued in 1943. The principal professional organization in the area is the Association for Computing Machinery, founded in 1947, which now has more than 2000 members.

Three more recent journals relating specifically to electronic computation are *Computers and Automation*, published since 1952; *IRE Transactions on Electronic Computers*, published since 1952; and the *Journal of the Association for Computing Machinery*, published since 1954. (The ACM issued *Proceedings* in 1952 and 1953.) The *IBM Technical Newsletter* is another useful source. "A Who's Who in the Computer Field" (27) and "A Computer Directory and Buyers' Guide" (26) have recently been prepared.

Types of Computing

Calculating machines may be divided into two classes, digital and analog. A digital machine operates directly with numbers, whereas an analog machine represents them by physical quantities, for example, intensity of electrical current or length of line. Thus an abacus is digital, whereas a slide rule is analogical. Educators have been concerned primarily with digital machines (altho the IBM test-scoring machine is analogical), and this emphasis will probably continue since analog computers, because they depend on measurement of physical quantities, are limited in accuracy. Hence only passing reference will be made here to the analog computer literature. Berkeley and Wainwright (12) compared digital and analog computers and discussed the advantages and disadvantages of each. An introduction to analog computer technics was prepared by Johnson (62) while Wadel and Wortham (109) listed the location of some of the principal analog computer installations.

Digital computers can be divided into those with internal storage of programs (the orders which control the machine during the calculations) and those which rely upon a control panel for instructions. For this review, the term *electronic computer* will be confined to machines with internal program storage. Machines which rely upon control panels will be classified as *punched-card equipment.* Internally stored programing enables greater computational flexibility and higher speed.

Digital Computers

A wide range of books and articles is available dealing with design, programing, and scientific application of digital computers. Development has been so rapid that recent titles provide the best start on a review of the literature. Surveys by Wilkes (113) and Booth and Booth (14) supply useful introductions. A special issue of the *Proceedings of the IRE* (57) was devoted entirely to electronic computation and covered a large variety of topics. Richards (90) was concerned with the basis in Boolean algebra of computer arithmetic. Bowden's edited symposium (15), altho slightly dated, deserves mention on account of its third section dealing with computer applications since the scientific usefulness of the machines in a wide variety of fields is indicated. (There is, however, no specific mention of computer use in educational research.)

The original objective in computer design was to make feasible those calculations of such great length that they otherwise either could not be performed at all or only with prohibitive labor. More recently it has become clear that computers will be equally important in achieving more rapid processing of comparatively simple clerical tasks. Business applications of computers range from maintaining a stock inventory to controlling airline reservations. This experience is relevant to educators because the same characteristics of large amounts of data and relatively simple calculations sometimes also pertain to educational research and recordkeeping. Developments in commerce and industry have been reviewed by Kozmetsky and Kircher (67) and by Hattery and Bush (54).

Computer Availability

When Fattu surveyed the computational field in 1951, he concluded: "In the none too distant future it is likely that a substantial group of universities and social science research organizations will have access to automatic computing equipment" (37: 425). This prediction has been substantiated in the ensuing six years. In 1951 there were few electronic computer installations, and those in operation were principally devoted to national defense problems. Since there had been no educational or psychological use when Fattu prepared his review, his references to electronic computation had to be drawn from the technical literature of engineering, physics, and applied mathematics. But the computer field was at that time on the threshold of rapid expansion, including commercial production of machines. By an interesting coincidence, it was in December 1951, the month when Fattu's review was published, that an electronic computer was first used in psychology (118). The machine was Ordvac, the first electronic computer built at the University of Illinois; it was made available for use by all University departments.

The 1957 picture is greatly different. Over 1200 computers are reported to be in operation in the United States, and there are many installations in other countries (18). Computational centers have been established at a number of universities and research organizations. Machine speeds have increased as newer computers have become available, so that the terms *high-* and *medium-speed* must be regarded as relative. Here the term *high-speed* will arbitrarily be taken to apply to machines which multiply at a rate of more than 1000 times per second. Expansion has been so rapid that it is difficult to secure a complete list of universities and research organizations with high-speed computers. Goode's tabulation (41), altho only two years old, is already dated, and Weik's survey (112) does not list all installations. Hence it has been decided to include a listing here, even if it proves incomplete.* High-speed computers are installed at University of California, Berkeley (IBM 701); University of California, Los Angeles (IBM 705; SWAC); Cambridge (Edsac); Harvard (Univac); Illinois (Illiac); Institute for Advanced Study (IAS); Massachusetts Institute of Technology (IBM 704; Whirlwind); Michigan State (Mistic); Pennsylvania (Univac); RAND Corporation (IBM 704; Johnniac); Sydney (Silliac). IAS, Illiac, Mistic, and Silliac are machines built to the same basic design. Iowa State College is building another machine of the class.

Medium-size computer installations include: IBM 650's at Armour Research Foundation, Boston University, Carnegie Institute of Technology, Case Institute of Technology, Cornell, Educational Testing Service, Florida, Georgia Institute of Technology, Houston, Indiana, Iowa State College, Kansas, Kentucky, Michigan, New York, North Carolina State College, Ohio State, Oklahoma, Oklahoma A. and M., Pittsburgh, Rochester, Stanford, Texas A. and M., Washington (Seattle), Washington (St. Louis), Washington State College, Wayne, and Wisconsin; Datatrons at California Institute of Technology, Chicago, Dayton, and Purdue; Ferrantis at Manchester and Toronto; Univac Scientific 1103A at Johns Hopkins; Univac Scientific 1101 at Georgia Institute of Technology; Pennstac at Pennsylvania State; Udec at Wayne; Elecom at Stevens Institute of Technology; Alwac at the Adjutant-General's Office; and CRC's at the School of Aviation Medicine and the Naval Postgraduate School. It is not known how many of these installations are available for educational and psychological research.

The role of a university computational center was discussed in a symposium edited by Hammer (50). Consideration was given to the equipping and financing of a center; the decision whether to lease, buy, or build a machine; training of personnel; development of better numerical methods; organization of a numerical analysis and computational curriculum; and calculations characteristic of various departments. Alman (2) and Gotlieb (43) contributed other descriptions of university computational centers.

As a guide to machine selection, Weik's survey (112) gave speed of operation, size of storage, input-output mechanism, rental or purchase price, and the like, for 103 makes of digital computers; Carroll (19) compared some computers in commercial production; and Bauer (11) provided machine specifications for half a dozen of the best known high-speed machines. Thomson, Harper, and Sawyer (99), in an American Psychological Association symposium, discussed the experience of the Personnel Research Branch, Adjutant-General's Office, in acquiring a computer. Recommendations as to the augmentation of the supply of trained manpower (especially trained programers) were made by a Wayne University conference (61). Rowan (93) considered selection of programers by means of psychological tests.

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* The author would appreciate being informed of any errors or omissions.

Programing—Directing an Electronic Computer

Most people know by now that the principal difficulty in computer use is the writing of programs, that is, the sets of orders which control the machine during the calculations. McCracken (73) recently issued a book on digital computer programing. His concern was not with any particular machine, but with the general logic made applicable to a fictitious one. Interesting attempts were made by Ward (110) and Hamming (51) to express the general principles of programing in brief articles.

Manuals giving programing instructions and order codes are available for most types of machines. A program for matrix multiplication presented by Cattell (23) in an appendix to his factor analysis textbook illustrates the formal organization. (It is also of interest as apparently the first program specifically prepared for psychological and educational use.) The programs for Edsac, the Cambridge computer, were reproduced by Wilkes, Wheeler, and Gill (114), and these authors rightly stressed the importance for any installation of developing and recording a program library as rapidly as possible. Frank (39) listed currently available Univac programs, and Wrigley (116) did likewise for Illiac.

An outstanding need is for a complete list of IBM 650 programs of use in educational research. At present only partial lists seem to be available, for example, abstracts issued by the IBM Applied Science Customer Assistance Group (60) and libraries listed by the University of Washington (107) and the Datamatic Corporation (25). The IBM library includes programs for analysis of variance, chi square, correlation, multiple correlation, phi coefficient, autocorrelation, matrix multiplication, matrix inversion, latent rods and vectors, and roots of algebraic equations. The University of Washington has programs for basic statistics (means, standard deviation, *t*-test, and the like), correlation, multiple regression, principal axes factor analysis, grade prediction, predictor selection, and optimal test time. The University of Wisconsin has a program for maximum likelihood factor analysis (52). The quartimax method of rotation in factor analysis was programed at Michigan, and the biquartimax method at Harvard (20).

Andrew L. Comrey (University of California, Los Angeles) prepared and mimeographed various correlational and factor-analytic programs for SWAC; Jack Block (University of California, Berkeley) did likewise for the IBM 701; Kern W. Dickman (University of Illinois) for Illiac; James C. Lingoes (Michigan State University) for Mistic; and Jack O. Neuhaus (University of California, Berkeley) for the CRC 102-A.

"Automatic" programing systems designed to leave as much of the labor of program organization as possible to the machine are now available for a number of computers. For example, Poley and Mitchell (87) prepared a manual with the interesting name of SOAP (an abbreviation for Symbolic Optimal Assembly Program) which describes a mechanized system of assembly for a 650 program.

Now that many organizations are using computers, better arrangements for program reporting and distribution are urgently needed. Programing is expensive: The cost has been estimated to average $2 per instruction, and the usual program has some hundreds of instructions (42). Hence cooperation is imperative if machines are to be used economically. Several groups have recently been formed to try to develop coordinated writing of and interchange of programs. A group known as SHARE (the Society to Help Avoid Repetitive Effort) is concerned with the IBM 704 (5); another group called USE (Univac Scientific Exchange) is fulfilling a similar function for the Univac Scientific 1103 A; and a Midwestern University Computer Users Committee is primarily concerned with the IBM 650.

Numerical Analysis

As might be expected, there has been a spate of books concerned with the theory and practice of numerical analysis. But methods continue to be discussed for the most part in terms of the desk calculator situation. From among the many methods available for most standard calculations, for example, solving algebraic equations, there is not yet consensus as to the most effective methods for electronic computations.

Dwyer's textbook (34) on linear computations probably remains the best single reference for the educator altho written with a desk calculator orientation. Rao (88) discussed various multivariate technics of potential importance to education, including some readily applied only upon an electronic computer. Textbooks covering the standard numerical course were written by Hildebrand (56) and Nielsen (83). Forsythe (38) and Luke (71) listed selected references in numerical analysis.

Computer Use in Education and Psychology

This section deals with the use of computers in educational and psychological research. Some associated developments in statistical method and research design are included. Since considerable attention has been given to factor analysis in order to restate it in mechanizable form, it will form the subject of a separate section.

Predictive studies are an obvious avenue for computer use. Previously the number of predictors has generally had to be limited to 10 or 12 on computational grounds. This restriction is removed by computers. Davison (29) used 34 predictors in her study of degree of frustration tolerance displayed by nursery-school children. These included several product terms enabling weight to be given in the regression equation to interactions observed between predictors. There is, of course, a greatly enhanced problem of shrinkage as the number of predictors is increased, but cross validation provides some protection until such time as the statistician can supply a really satisfactory answer. Simon (97) employed multiple criteria in a predictive study of Air Force mechanics. Each criterion measured a different dimension of job performance; dimensions were selected by a factor analysis of the criteria. Merrill and Bennett (79) discussed the application of temporal correlation technics in psychology in terms of electronic computer potentialities. Leiman (69) described the distribution of nearly 12,000 airmen to jobs in accordance with differential aptitude indexes and predetermined quotas. Lee (68) considered computer use in nonlinear multivariate prediction, and Ziegler (121) developed a computer procedure for determining biserial correlations of items with a criterion.

Computers have been used for experimentation upon the arithmetical properties of sampling problems and probability chains. The principle of the Monte Carlo method (80) is to estimate a quantity by random sampling rather than approximate it by calculation. A computing program is devised to calculate a sequence of numbers satisfying statistical tests for randomness. Its greatest usefulness probably applies to cases when there are stochastic processes. Tocher (100) discussed the application of computers to sampling experiments which can be imitated in the computation. Rosenthal and Ferguson (91) used a pseudo-random sequence to determine the sampling distribution of the Friedman nonparametric test. Block (13), using empirical data (correlated items drawn from the Minnesota Multiphasic Personality Inventory), examined the proportion of items which indicated two samples to be significantly different at some given probability level when in fact the population had been randomly divided into two parts.

Two distinctly novel uses of computers were reported. Green (45) devised a procedure for preparing stimuli for form perception experiments with random elements introduced by generating displays on an oscilloscope by a computer program and photographing them on filmstrips. As a contribution to the rapid processing of, and decision making upon, a large amount of information (e.g., relative positions of many fast-moving aircraft), Rowan (92) used a computer, first to generate a simulated flight pattern, and then to synthesize the data and to make appropriate decisions on the best method for handling the situation.

Tucker (105) seems to have been the first to consider the research potentialities of computers. He illustrated his discussion by proposing use of a computer for selecting test items with respect to their difficulty in such a way as to maximize validity. The suggested function was of such complexity that use of an electronic computer would be mandatory. Wrigley (116) summarized advantages and disadvantages of using computers in psychological research and indicated some likely changes in numerical practice and research design.

Factor Analysis

Factor analysis has traditionally involved recourse to human judgment in a way quite foreign to any other standard psychometric technic. High-speed machines, however, have made it essential to rewrite factor analysis (or any other classificatory technic which seeks to supersede it) in completely objective form.

In a review of contemporary factor analysis, Cattell (24) devoted a section specifically to the effects of the new computational aids upon factor-analytic design. The need for more mechanizable procedures seems to have been largely responsible for the developments in communality estimation and in analytic methods of rotation already reviewed in Chapter VIII.

When a computer is available, some mathematically more defensible method than the centroid can be used. The choice seems to lie between the Pearson-Hotelling principal axes method and the Lawley-Rao maximum likelihood method. Wrigley and Neuhaus (119) described the use of a computer for calculating principal axes solutions. Harris and Peirce (52) described a maximum likelihood solution adapted to the IBM 650. Rao (89) developed the maximum likelihood method (which he preferred to call the canonical method of factor analysis) in an especially convenient form for electronic computation, thereby supplying factor analysis with a mathematically derived test for the significance of factors. The feasibility of the maximum likelihood method, now that computers are available, was illustrated by Lord (70) in his analysis of speed factors (a 39-variable study). Because of the double iteration, however, to determine both the communalities and the number of significant factors, the method is slow to converge unless initial estimates are reasonably accurate.

Comrey and Levonian (28) used a computer to compare the factors derived from the use of three different coefficients of correlation (the tetrachoric correlation, the phi coefficient, and the corrected phi coefficient, i.e., phi divided by maximum phi) and concluded that the phi coefficient was more acceptable for factor-analytic work than generally believed. Wrigley and Dickman (117) used an index of factorial matching to study sampling variability of loadings when a sample of subjects is randomly divided into two.

Better computational aids are making possible factor analysis of large sets of items. Osgood and Suci (85) used a computer in a factor analysis of adjectival scales to determine the dimensions of meaning. Comrey and Levonian (28) showed the practicability of determining the factorial structure of the items of as large an inventory as the MMPI by making centroid analysis of the principal scales in succession. Wrigley and others (120) factored a set of 200 dichotomous items measuring aircraft mechanics' performance by modifying the square root method to enable systematic selection of pivot variables. Cattell (22) discussed the possibility of enhanced use of P-technic because of computational developments.

The possibility of a completely objective and therefore completely mechanizable system of factor analysis was recently demonstrated by Wrigley (115). He proposed insertion of squared multiple correlations instead of communalities in the leading diagonal, analytic rotation of all factors with positive latent roots, dividing the sample randomly into two and repeating the procedure for each section, and then calculating indexes of matching for the two sets of factors to determine the replicability of each factor.

Canonical analysis generalizes the multiple correlational procedure to the situation where there are multiple dependent variables, and each criterion dimension is to be predicted separately. Computers make this technic (along with much other disused multivariate algebra) practicable. Healy (55) reported a rotational method for computing canonical correlations.

Other investigations have sought to replace factor analysis by some other technic taking more into account the patterns and clusters revealed by the data. Altho this configurational approach seems to accord with clinical experience in psychology, and also with holistic theoretical conceptions, the development of satisfactory statistical methods has been delayed by the computational labor of examining a multiplicity of patterns. McQuitty (77, 78) devised new technics for handling the configurational problem, named agreement analysis and linkage analysis respectively, which have been oriented toward use of an electronic computer. Likewise Tryon (104) modified his method of cluster analysis to make use of the new machines.

Punched-Card Procedures

Ten years ago a sharp distinction could be made between electronic computers and punched-card equipment. The latter included sorters, tabulators, reproducing punches, multiplying punches, and the like. The boundary is no longer so distinct. Electronic computers often have punched-card input and output, while multiplying punched-card units may have vacuum tubes for more rapid calculation. The dichotomy based upon whether or not programs are internally stored means that the IBM 604 and 607 are here classified as punched-card equipment. Their electronic components, however, might entitle them to be classified with the electronic computers.

General surveys of punched-card operations were prepared by Casey and Perry (21) and by Hartkemeier (53), while a manual was prepared outlining the fundamental principles, applicable to all types of punched-card machine, of control-panel wiring (59). Gruenberger (48) issued a computing manual based upon university use of punched-card equipment at the University of Wisconsin, and later supplied control-panel diagrams for some standard computations (49). Lunneborg, Wright, and Ax (72) published some plugboard diagrams prepared at the University of Washington.

Appel and Cooper (4), Bass and Wurster (10), and Deemer (30) considered the use of mark-sense cards to eliminate card-punching and card-verifying. Traxler (102, 103) discussed the merits and demerits of the test-scoring machine, and Staugas (98) dealt with test scoring when item data were already punched on the cards.

Correlational technics received a good deal of attention. Ayers and Stanley (8) described a rolling totals method for forming sums of squares and cross-products, while Burke (16) dealt with the special case when some numbers were negative. Procedures for solving multiple regression equations were presented by Allan and Attridge (1) and by Greenberger and Ward (46). The calculation of serial correlation coefficients was described by Payne and Staugas (86) and by Schipper and Gruenberger (94), and the computation of residual matrices in factor analysis was handled by Friedman and Ward (40).

Various papers related to item analysis and test construction. MacLean and Tait (76) dealt with the computation of item and test means, variances, correlations, and item-selection indexes. A method for calculation of a joint occurrence matrix was described by Grace (44), while Caffrey and Wheeler (17) devised a new chi-square formula which could be more simply handled on punched-card equipment. DuBois, Loevinger, and Smith (33) devised a method called edge punching for calculating variances and covariances of dichotomous items. Farrell and Stern (36) reported on calculation of tetrachoric correlations; and Siegel and Cureton (96), on the calculation of biserial correlations for the evaluation of items.

Kephart and Oliver (65) dealt with the scoring in the method of paired comparisons, and Kahn and Bodine (63) discussed Guttman scale analysis. The analysis of factorial experiments was considered by Bainbridge, Grant, and Radok (9), and the calculation of an uncertainty function in information theory by Newman (82). Katz (64) described the analysis of multiple-level sociometric data. Ward (111) illustrated the great saving in time made by an IBM 607 by reanalyzing data.

Other Computational Aids

Even in a period dominated by the emergence of the electronic computer, the simpler computational aids were not entirely neglected. Gruenberger (47) advised on selection of a desk calculator, and Dwyer (35) considered the circumstances in which a desk calculator is to be preferred to punched-card equipment or electronic computers. Arnold (6) wrote a book on use of the slide rule.

The Brain-Machine Analogy

While there is general agreement that an electronic computer is very different in its operation from a human brain, the points of comparison and contrast continue to interest scholars and led to a provocative and challenging series of papers. A symposium of the Institute of Radio Engineers (101) provides a good start for any reader wanting to pursue this line of investigation. Other important papers were written by McCulloch (74), Turing (106), MacKay (75), Von Neumann (108), Wilkes (113), Ashby (7), and Shannon (95). Specific consideration was given to machine "learning" and machine "insight" by Oettinger (84) and Deutsch (31) respectively, while Kochen (66) considered "group behavior" of robots.

Summary

This review affords only a glimpse of the activity in the computational field from 1951 to 1957. Many references could not be cited for lack of space, and much other computational development remains unpublished. By now many universities have computing centers, and educators are regularly working with calculating machines and becoming familiar with their strengths and limitations. But the field is in a transitional state. There remains a shortage of trained personnel; there is redundant programing and rather little interchange of information from one organization to another; program libraries are often inadequately reported; there has probably been too heavy an emphasis on the traditional procedures of multivariate analysis; and the full range of mathematical and statistical potentialities has hardly yet been explored. Fattu's comment of 1951 remains appropriate to a considerable extent in 1957: "Adapting these new technics to research remains." But the foundations have been laid.

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CHAPTER X

Action Research: A Teaching or a Research Method?

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Closing his 1953 review of action research, (the terms *cooperative* and *cooperative action* are favored currently), Wann (30) remarked that an action methodology was only beginning to emerge and that additional experimentation would be needed to make it practical for teachers to carry on research of a high quality. Since this major survey of the literature, the Review has carried a number of reports on the further development of the action-research line (11, 21, 29). It seems desirable, therefore, to evaluate these efforts as contributions to methodology as well as further to catalog the literature. As an organizing theme we are returning to Wiles's earlier queries (32) on a distinction between action research and inservice training.

If we examine the writing about action research, it becomes apparent that some difference of opinion exists, even among those who are most enthusiastic, as to whether the action research approach does, in fact, constitute a new research departure. There are those who contrast action research with traditional or fundamental research (2, 3, 4, 5, 15). In its sharpest form this separation gives rise to statements to the effect that, instead of borrowing without change research methods from the sciences, research workers in education are now striking out on their own and building new skills (4). In a more moderate vein the distinction is made on the basis of the kinds of problems researched (1, 5, 25), on the adaptability of the research findings to real situations (5), on the motivation of the researchers (7), on the kinds of generalizations sought (15), on the intrinsic value of the research to the practitioner (12, 17), and most often and most importantly on who does the research (3, 5, 25).

Do any of these distinctions, important as they are, provide the foundations for a new methodology? Our answer will depend, of course, on a definition. If we require, as a minimum condition, that a new methodology or technic give us a new way of organizing or analyzing phenomena so as to lead to the generation and test of new hypotheses or to fresh ways of testing old ones, it is questionable if any of the features central in the thinking of the action researchers make much of a contribution to research methodology (however great a contribution they do make to the inservice education of teachers).

This is a rather sweeping judgment, but it can be tested in several ways. If, for one thing, we examine the three major recent books concerned with action research (3, 14, 22), we will find that once the questions of getting research used and of getting teachers to hypothesize cooperatively about their concerns are dealt with, the business of testing these hypotheses must be faced. And at this point the discussions are reduced to the employment of the traditional methodologies and technics. This reduction is discerned by the writers.

Others have seen the point as well. Thus Ahrens (1) spoke of the necessity of adapting the methods and procedures of the professional researchers. Shumsky (25) pointed out that the distinction between cooperative and individual research as separate processes was vastly overdrawn. Blum (5) saw the essential difference as one of the attitude of the researcher.

Finally, to support the conclusion above, we can examine the production of the action-research teams. These are some of the hypotheses that have resulted: that spelling will be improved if the material is chosen from "real" material rather than from spellers (1); that students will benefit if common experiences, alternative methods of word attack, and oral experiences precede reading (28); that a survey will identify the nature of the remedial reading problems in a school (17); that favored reading material depends on content rather than length (18).

The point is not at all that these hypotheses are trivial, for any method may be used to research trivia, and, moreover, there is no reason for questioning the authors when they state that the hypotheses were important to the teachers doing the research. The point is, rather, that these are hypotheses which could have been arrived at thru any of the traditional methods. The argument is even sharper when we examine the technics by which the hypotheses were tested. Checklists, case studies, tests of means, and similar devices were employed. As a contrast, compare the jump forward in the nature of the hypotheses which were made testable by the introduction of a technic like analysis of variance, for example (27).

What is at issue is not the purity of research. Rather it seems important to achieve clarity about the nature of action research in order to protect the positive contribution which the approach has made.

Common to many of the reported action researches are statements to the effect that teachers found cherished prejudices challenged, that leadership was developed, that lines of communication became clearer, that interest in research was engendered, and that curriculum change was facilitated (1, 13, 14, 16, 17, 18, 19, 24, 28). There are reports of success in incorporating the approach both in the training of teachers and in the teaching of public-school classes (10, 13, 20, 22, 26, 31). Any movement which will encourage a turn toward problem solving in teacher education needs to be nourished. This, it would appear, is the distinctive contribution which action research does make.

The emphasis on action research as a separate and distinctive modern research methodology to be contrasted with traditional methodologies seems self-defeating of this positive contribution. Such emphasis introduces conceptions which will not produce warranted evidence either about practical or impractical problems. One example is the conception that research findings become valued only at the point where the teacher replicates them (12). Strictly read, such a conception negates the possibility of learning anything from the research efforts of others. We would find ourselves asking questions which have been asked and answered many times before, and each of us would be put in the position of accepting only the answers obtainable with our own technical skill (3). Stemming from this viewpoint is a revival of the conception that there is some fundamental difference between applied and pure research, which takes expression in repeated statements that action researchers are somehow not interested in generalization, but only in whether or not teachers are accomplishing the things that they hope to accomplish (4, 7). But as Prewett (23) suggested, if our goal is to channel teachers into research rather than research into teachers, we need more rather than less concern for theory.

The principal danger which results from a confusion of the teaching and research functions of action research is the justification for the relaxation of elementary safeguards of the warranty of evidence which results. It is one thing to defend oversimplified hypotheses (3), to overlook necessary controls (28), to encourage changing hypotheses in midstream (5), to ignore the problem of reliability in stating that teachers are best fitted to know what is going on in their classrooms (3), and so on, *if* our purpose is simply to get teachers to engage in group processes or to introduce them to problem-solving methods. It is something else again if we defend these practices as somehow contributing to the production of valid inferences.

The original point of departure of action research was the failure of educational research to play a significant role in changing practice (6, 8). The answer found was to change the research personnel, to involve classroom teachers more directly in the research. If this is to be achieved, it will mean that teachers will have to take the time and effort to acquire the necessary tools, and that rather than striking out on their own, more time will have to be given in the teacher-education program for the study of methods of inquiry. Corey (9) spelled out some of the implications of the action-research movement for the teacher-education program.

Finally, note has to be taken of Blum's argument (5) that the action-research movement is a revolt against the separation of fact and values. If educational research, whether done cooperatively or noncooperatively, by action or in action, by professional or amateur, is to be valued, it is necessary that the researchers make explicit the preferences that undergird their efforts, and tackle the problems which are most pressing rather than those which are most convenient.

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